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UK considering lifting restrictions on health workers with HIV – as long as viral load is undetectable

Roger Pebody
Published: 01 December 2011

The Department of Health has opened a consultation on possible changes to its policy on the employment of people with HIV. The current ban on people with HIV performing specific procedures in surgery, dentistry and gynaecology may be lifted, so that staff who are taking antiretroviral therapy and have a viral load below 200 copies/ml could work in the NHS.

Implementation of the proposal will, in part, depend on the responses received during the public consultation that is open until 9 March 2012. Patient safety in the NHS is a sensitive political issue and if public discussion is not informed by scientific evidence, the proposals could be controversial.

Current UK policy is for a total ban on HIV-positive healthcare workers performing ‘exposure-prone procedures’. As a result, a number of medical jobs are not open to people with HIV and the consequences for someone diagnosed in the middle of their career can be devastating.

An exposure-prone procedure is one in which injury to the healthcare worker could result in the worker’s blood contaminating the patient’s open tissues. These procedures involve a combination of sharp objects and the worker’s hands being in a body cavity. Surgery is the most obvious example, but many dental procedures are also considered ‘exposure-prone’.

Only a few other developed countries (including Australia, Ireland and Italy) have a policy as restrictive as that of the UK. It is more common for the management of an HIV-positive healthcare worker to be determined on a case-by-case basis. This is the situation in Austria, Belgium, Canada, France, New Zealand and Sweden, for example.

A current court case, in which a dentist with HIV is claiming the current ban is discriminatory and unlawful, helps explains why the government is considering the change.
A working group of experts examined the evidence on the risk of transmission occurring in healthcare settings, especially when patients have been treated by an HIV-positive health worker. Internationally, there have only been four cases of transmission, none of them in the UK. In the United States, testing of 22,171 patients who had been treated by 51 different HIV-positive workers, including surgeons, obstetricians and dentists, did not identify any new HIV infections.—

During some of the less invasive ‘exposure-prone procedures’ (such as a local anaesthetic injection or a routine tooth extraction), the experts consider the transmission risk to be “negligible”. During the most invasive procedures (such as a caesarean section or open cardiac surgery), they consider the risk to be “extremely low”.

But the experts consider that the risk of HIV transmission will vary, depending on the infectiousness of the health worker, as measured by viral load.

They therefore recommend that HIV-positive workers should be allowed to perform exposure-prone procedures as long as:

- They are taking combination antiretroviral therapy
- Their viral load is consistently below 200 copies/ml (tests taken every three months)
- They are under the joint supervision of a consultant in occupational medicine and their usual doctor.

The recommendations therefore open the possibility of individuals taking HIV treatment for occupational health reasons, when it would not otherwise be recommended.

Workers whose viral load rebounded or who ceased to comply with the testing requirements would be asked not to perform exposure-prone procedures until the situation was resolved.

Based on the prevalence of HIV in the England and the number of NHS employees who perform exposure-prone procedures, the experts estimate that the measures could affect around 110 HIV-positive workers (including those with undiagnosed infection).

England’s Chief Medical Officer, Dame Sally Davies, commented: "We need to ensure that the guidelines and restrictions imposed are evidence-based and achieve a fair balance between patient safety and the rights and responsibilities of healthcare workers with HIV. This consultation will seek wide views on the expert advice and whether it should be accepted."

The chairman of the Expert Advisory Group on AIDS, Professor Brian Gazzard, said: "Our careful review of the evidence suggests that the current restrictions on healthcare workers with HIV are now out of step with evidence about the minimal risk of transmission of infection to patients and policies in most other countries. This risk can be reduced even further if the healthcare worker is taking effective drug therapy for HIV and being monitored by HIV and occupational health specialists."

As healthcare is a responsibility of the devolved administrations in the United Kingdom, there are likely to be parallel consultations in the four countries. England and Scotland have already issued consultation documents, both of which are open until 9 March 2012.

**Stopping the AIDS Epidemic in Its Tracks**

Posted: 12/ 1/11 08:02 AM ET

World AIDS Day is a time for us to consider the state of the epidemic and the challenges we must overcome to achieve a world without AIDS. It’s a time to reflect on the fact that we ALL have a role to play in ending this disease. And one of the most important ways we can stop AIDS in its tracks is simply by fighting stigma and homophobia.

This World AIDS Day nearly coincides with the 20th anniversary of the death of my dear friend, Freddie Mercury. If Freddie were alive today he would feel very much as I do. He’d be astonished by how far we’ve come in treating and preventing HIV/AIDS since the frightening and tragic early days of the epidemic. But he’d also be saddened and dismayed to see that rampant stigma and homophobia continue to drive this disease.

The devastating impact of discrimination against gay people and people living with HIV are clearly reflected in the alarming incidence of HIV/AIDS in the gay community. In American cities, as many as one out of every five gay and bisexual men is HIV-positive, and half of those infected are unaware they have the disease. Indeed, HIV prevalence in our community is on par with some of the hardest hit regions of the developing world. Also, new HIV infections are actually on the rise among gay and bisexual men—the only risk group in America for which this is the case.

Clearly, we must do more, MUCH more, to reduce the incidence of HIV among gay and bisexual men, and that work has to begin within our community. In the early days of the AIDS epidemic, we rose up with
our straight allies, claimed for ourselves equal rights and equal value as human beings, and demanded
solutions for a health crisis that affected not just the gay community but every population across the
globe. And it WORKED! HIV rates among gay men declined dramatically by the late 1980s, and we can be
justifiably proud of our efforts then.

But today's statistics show that we have stalled in our drive against this disease. We’ve dropped our
guard and become complacent, and in that void, AIDS is thriving in our community once again.

Today, on World AIDS Day 2011, I’m ringing the alarm bell. We must WAKE UP! There are three
immediate challenges before us, and we have to address them NOW!

First, we must help our young people to combat the many negative messages our society still flings at
gay people. We have to teach gay men to love and accept themselves, to value and protect their health and
the health of others, and to join the campaign for our equal rights as human beings. We cannot be silent
or invisible. The old slogan “Silence = Death” is every bit as relevant today as it was in the 1980s.
Homophobia can be neutralized by familiarity and experience and compassion. Stigma can be eradicated
by courage and pride and unity. We can begin to end AIDS when we empower ourselves.

Second, we must take responsibility for our own health and well-being. We must get tested and
retested. Too many of us do not know our HIV status, and that MUST change.

Third, we must not let our federal and state governments balance their budgets by cutting crucial
funding for HIV prevention, treatment, and research. Reducing or eliminating HIV programming today
will cost us much MORE money down the road. That's because these investments pay for themselves in
terms of infections prevented, health preserved, and lives saved. Earlier this year, the National Institutes
of Health released a groundbreaking study demonstrating conclusively that people living with HIV who
receive effective antiretroviral treatments are 96 percent LESS likely to pass the disease to their sexual
partners. In other words, HIV treatment IS prevention. Therefore, we should be INCREASING funding
for HIV treatment programs, not implementing cuts, as many states are doing today.

We have all of the tools we need to stop this epidemic in its tracks. Working together, I believe my
little son Zachary and his generation can live to see a future without AIDS. But to get there, we have
serious work to do. We must fight stigma, homophobia, and apathy. We must learn to love and value our
lives and our health. We must be honest in our own relationships. We must get serious about the risky
behaviors that have become commonplace once again in our community, and the negative messages that
courage this behavior. We must acknowledge the dangerous substances that are known drivers of
infection. We must demand health funding.

But more than anything, we must educate and mobilize young people to join the fight not only
AGAINST the AIDS epidemic, but also FOR health and acceptance and love. On this World AIDS Day, let
us spread messages of tolerance and compassion that are so critical to ending AIDS.

Complacency Is the Biggest Barrier to Ending AIDS

USA Today, (12.01.2011) — Anita Manning
AIDS is a declining concern among Americans, and that complacency is a key reason the disease
continues to spread, top US health officials say.

“We are no longer in crisis mode after 30 years of HIV. Certainly in the United States, the sense of
 crisis has waned,” said Dr. Kevin Fenton, director of CDC’s National Center for HIV/AIDS, Viral
Hepatitis, STD and TB Prevention. “But the reality is that people are still becoming infected and people
are still dying of this disease.”

Recent research conducted by the National Institutes of Health found the combination of
antiretroviral treatment and using safer behaviors makes people with HIV far less likely to transmit the
virus to others. It shows “treating people with HIV [is] 96 percent effective in reducing transmission,” said
Joel Gallant of Johns Hopkins University, vice chair of the HIV Medicine Association (HMA). “Nothing
has been that effective, not condoms, not abstinence. That should be a call to action.”

The research “brings home that treatment is prevention,” said CDC Director Dr. Thomas Frieden. “We
have the tools to stop HIV’s spread in individual patients and the tools to greatly reduce its spread in
communities.”

CDC on Tuesday announced new funding for state and local health departments to enhance HIV
testing and treatment services.

Funding these services must be a priority, said Gallant, even given the current climate of cash-
strapped state budgets and HIV patients on waiting lists to access medicines. “People are getting on
treatment much later, and during that time, are potentially creating more HIV cases,” he said. “It’s not a moral way to go.”

HMA is concerned health care reform could make matters worse by restructuring federal funding mechanisms, Gallant added. The infrastructure that has been built around serving HIV/AIDS patients could disappear, potentially creating critical gaps, he said.

A Tale of Two Countries: Rethinking Sexual Risk for HIV Among Young People in South Africa and the United States

*Journal of Adolescent Health* Vol. 49; No. 3: P. 237-243.e1, (09..2011)— Audrey E. Petifor, PhD, MPH; Brooke A. Levandowski, PhD; Catherine Macphail, PhD; William C. Miller, MD, PhD; Joyce Tabor, MS; Carol Ford, MD; Cheryl R. Stein, PhD; Helen Rees, MD; Myron Cohen, MD

Seeking to better understand the potential role of sexual behavior in HIV transmission in two countries with strikingly different HIV epidemics—the United States and South Africa—the study authors used nationally representative, population-based surveys of people ages 18-24 to compare sexual behaviors.

Data from 7,548 South African young people and 13,451 US youths showed HIV prevalence of 10.2 percent in South Africa and less than 1 percent in the United States. Young men and women in the United States reported an earlier age of first sex than their South African counterparts (mean age of coital debut for women: US [16.5], SA [17.4]; for men: US [16.4], SA [16.7]). US participants reported a higher median number of lifetime partners (women: US [4], SA [2]; men: US [4], SA [3]). Reported condom use at last sex was lower among US youths (women: US [36.1 percent], SA [45.4 percent]; men, US [48 percent], SA [58 percent]). On average, young South African women reported greater age differences with their sex partners than young US women.

“Young people in the US report riskier sexual behaviors than young people in SA, despite the much higher prevalence of HIV infection in SA. Factors above and beyond sexual behavior likely play a key role in the ongoing transmission of HIV in South African youth, and thus should be urgently uncovered to develop maximally effective prevention strategies,” the authors concluded.

'And Let Me See Them Damn Papers!' The Role of STI/AIDS Screening Among Urban African-American and Puerto Rican Youth in the Transition to Sex Without a Condom

*AIDS and Behavior* Vol. 15; No. 7: P. 1359-1371, (10..2011)— Traci Abraham; Mark Macauda; Pamela Erickson; Merrill Singer

Project PHRESH.comm is a mixed-method, ethnographic study incorporating data from focus group discussions, semi-structured interviews, coital diaries, systematic cultural assessments, and a structured survey designed to explore concepts of risk and condom use decision-making among at-risk African Americans and Puerto Ricans ages 18-25 in Hartford, Conn. Common strategies employed by US youths to prevent HIV/STI transmission include abstinence, monogamy, and safer sex; however, these require a high level of vigilance and responsibility and, the researchers reported, “according to inner-city participants in Project PHRESH.comm, neither option is always desirable, available or rational in the context of their lived experiences.”

In the current study, many of the young adults reported relying on a strategy of using clinic-sponsored STI/AIDS screening when wanting to discontinue condom use with a partner. Though the data suggest that screening is commonly used by couples seeking to move to sex without a condom, it also showed that most youths do not maintain monogamy even in long-term, serious relationships.

“Thus, sharing test results may provide a false sense of security in the sexual culture of inner-city, minority youth,” the research team concluded.

Seeing Chance to End Spread of HIV, City's Health Chief Pushes Earlier Drug Treatment

*New York Times*, (12.01.2011)— Anemona Hartocollis

Health Commissioner Dr. Thomas Farley is recommending that New York City doctors begin treating HIV as soon as a patient is diagnosed with the infection. This change in city policy is being driven by new research showing that early treatment leads to longer, healthier lives and a 96 percent lower risk of transmission, he said.
“I am more optimistic than ever that we can really drive down rates of infection, and that we may ultimately see the end of this epidemic,” Farley said in a briefing sent to health care providers on Thursday, World AIDS Day.

Farley’s proposal is similar to one adopted by San Francisco in 2010. There, doctors began prescribing early treatment even before city leaders put forth guidelines, and many providers in New York are likely doing the same, said Dr. Moupali Das, director of research in the San Francisco health department’s HIV prevention section.

Roughly 110,000 New Yorkers are known to have HIV; among those tracked by the health department, 83 percent are receiving antiretroviral drugs.

Charles King, president of the advocacy group Housing Works, questions whether the science supports such an aggressive treatment policy. He noted that many poor patients delay treatment because once the disease progresses to AIDS, they are eligible for specific housing and nutritional benefits.

Nigeria Anti-Gay Marriage Bill Risks AIDS Funding


Some AIDS advocates and prevention workers worry that a new anti-gay bill in Nigeria could put their work in jeopardy if it becomes law. Passed recently by the Senate, the bill criminalizing gay marriage also levels 10 years in prison for organizing, operating or supporting gay clubs, organizations, and meetings. Advocates say it could be used against groups providing HIV/AIDS outreach to gay men.

“We work with them trying to reduce their risk factors, trying to make them more healthy and have safer sex practices,” said Meyiwa Ede of Society for Family Health. “If we can’t work with them anymore, then they are vulnerable.”

UK Prime Minister David Cameron recently threatened to cut aid for African countries that discriminate against gays and lesbians, and advocates fear that could impact HIV/AIDS work. However, while the US and UK governments have issued statements saying they are watching the bill closely, neither commented on how that outreach could be affected were the bill to pass the House and be signed into law by Nigerian President Goodluck Jonathan.

Such a law would not affect state-funded HIV programs, said Onyebuchi Chukwu, Nigeria’s health minister. The ministry has no programs specifically targeting gays and lesbians, said spokesperson Rekia Zubairu.

An estimated 80 percent of HIV infections in Nigeria are acquired heterosexually, according to new data from the country’s National Agency for the Control of AIDS.

Once Daily Dosing Improves Adherence to Antiretroviral Therapy

AIDS and Behavior Vol. 15; No. 7: P. 1397-1409, (10.2011) – Janet Raboud; and others

The association of once-daily antiretroviral dosing with self-reported ART adherence was the subject of the current study. The team examined this association among participants of the Ontario Cohort Study who were currently taking ART and who had completed a 90-minute, interviewer-administered questionnaire. Missing one or more ART doses in the four days preceding the interview was defined as suboptimal adherence.

Most of the 779 participants were male (85 percent), white (67 percent), and men who have sex with men (69 percent). Their median age was 48 years (IQR 42-54); they had been taking ART for a median of nine years (IQR 5-13); and their median CD4 count was 463 cells/mm3 (IQR 320-638).

“Fifteen percent of participants reported suboptimal adherence in the four days prior to the interview,” the authors wrote. A multivariable logistic regression model found that those participants taking once-daily regimens were half as likely to have missed a dose in the previous four days.

“Other independent correlates of suboptimal adherence were younger age, lower positive social interaction and increased frequency of consuming >6 alcoholic drinks on one occasion,” the authors concluded.

Middle East and North Africa records the highest number of HIV infections ever in the region in 2010 but recent progress is promising

04 December 2011

A report on the HIV epidemic in the Middle East and North Africa (MENA) shows that while the overall HIV prevalence in the region is still low, the rise in new infections since 2001 has put the MENA region among the top two regions in the world with the fastest growing HIV epidemic.
The report was released on 4 December under the auspices of the League of Arab States (LAS) in Cairo, Egypt. The event brought together the Arab States delegates and Ambassadors accredited to the Arab Republic of Egypt, civil society organizations including associations of people living with HIV, donors, religious leaders, community groups and media, private sector, Goodwill Ambassadors and UN agencies.

The report shows that there has been significant policy development and scale up of programmes indicating an increased political will in the region to address the AIDS epidemic. The majority of countries in the region have put in place national strategies to address AIDS and some have initiated programmes for key populations at higher risk, including sex workers, people who inject drugs and men who have sex with men.

UNAIDS Deputy Executive Director Programmes, Dr Paul De Lay, applauded the progress made. “Ten years ago, HIV was not on the political agenda in the Middle East and North Africa. Today, all countries in the region have become more engaged in the HIV response,” said Dr De Lay.

According to the report, the estimated number of adults and children living with HIV in the region increased from 330,000 [200,000-480,000] in 2001 to 580,000 [430,000-810,000] in 2010. The report attributes this rise to increased number of new HIV infections among key populations at higher risk and transmission of the virus to their sexual partners.

In 2010, there were 84,000 [57,000-130,000] new HIV infections and 39,000 [28,000-53,000] AIDS-related deaths in the Middle East and North Africa region. The annual estimated new HIV infections and AIDS-related mortality has almost doubled in the past decade. While countries have increased provision of antiretroviral therapy (ART) by 25% in the last year, the total regional coverage remains low, with only 8% of eligible people living with HIV accessing treatment in 2010.

Civil society organizations are now playing a more prominent role in the HIV response compared to just a few years ago. However, key challenges to scale up AIDS programmes among key populations at higher risk of HIV still remain. “Work with key populations is difficult in settings where the levels of stigma and discrimination are high and the overall support from governments is limited,” said Mrs Hind Khatib-Othman, UNAIDS Director of the Regional Support team for MENA region.

Key political declarations adopted in the region include the 2010 Dubai Consensus Statement and the 2011 Riyadh Charter. Professor Ziad A. Memish, Assistant Deputy Minister of Health for Preventive Medicine of the Kingdom of Saudi Arabia, representing the Minister of Health who is also Chair of the Ministerial Steering Committee of the LAS, spoke about the Arab Initiative—a follow up mechanism to the Riyadh Charter—as an important step for the region to ensure it lives up to international commitments.

Dr Sima Bahous, Assistant Secretary General and Head of the Social Development Sector at the League of Arab States welcomed the report and pointed to the existing relations of cooperation between the Arab League and UNAIDS. Dr Bahous also stressed the Arab League’s keenness to work with all the relevant stakeholders to achieve the targets of the Millennium Developmental Goals and the 2011 Political Declaration on HIV/AIDS adopted by the UN General Assembly. “It is time to act on the commitments and take necessary measures to keep HIV prevalence low,” said Dr Bahous.

The report outlines many recommendations on how to strengthen the AIDS response in the MENA region. These include review of laws and policies that hinder access to HIV prevention and treatments services, to invest smartly using an evidence-informed and human rights based approach, and the importance of strong political leadership.

“Decision-makers need to demonstrate the political courage to focus the response on the populations most affected by HIV. The 2011 Political Declaration should be the foundation for such leadership,” concluded Dr De Lay.

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**Too promiscuous to donate an organ? Maybe, CDC says**

Organ transplant experts are worried that proposed new federal health guidelines will limit the number of available donors and recipients willing to accept organs newly classified as risky.

By JoNel Aleccia

If you’ve had sex with two or more partners in the past year, you may be considered a risky organ donor, at least according to proposed new federal health guidelines that have drawn sharp protests from transplant experts who say they’re far too broad.
“With the new guidelines, every college student in America will be high risk,” said Dr. Harry Dorn-Arias, a transplant surgeon at the University of Virginia. “Right now, it’s probably a prostitute or a guy with a needle in his arm. Next time, it will be just a young guy.”

Under the new policy proposed this fall by the Centers for Disease Control and Prevention, deceased and living donors who were not monogamous in the previous 12 months would be considered at increased risk of transmitting HIV, hepatitis B and hepatitis C—even if they had no other risk factors.

CDC officials say the proposed guidelines are aimed at making the organ supply safer and preventing accidental transmission of life-threatening infections. The policies wouldn’t absolutely ban anyone from donating, especially in an exceptional or life-saving situation, but they would call for more scrutiny and testing.

“It’s geared for the patient so the patient knows as much as they can about the organ being transplanted in them,” said Dr. Matthew J. Kuehnert, director of the CDC’s office of Blood, Organ and Other Tissue Safety.

But transplant experts are outraged because they say the proposal arbitrarily focuses on monogamy and could limit both the number of available donors and the number of recipients willing to accept organs newly classified as risky.

They worry that potential living donors may balk at donating if they know their sexual history alone could raise questions about their suitability, particularly if the situation involved a family member.

“If you were going to give your organ to your mom or dad or sister, you’re going to be ashamed of that,” said Dorn-Arias. “You’re either going to say no, or you’re going to lie.”

The proposed policy could also require families of deceased donors to answer uncomfortable questions—ones they may not even know the answers to—about the specific sexual behaviors of their loved ones.

“It’s probably going to triple what we consider high risk at this point,” said Tracy Giacoma, transplant administrator at the University of Kansas Hospital. “It may scare patients off from taking these organs. More patients may die because they don’t take these organs.”

More than 28,000 organs are transplanted each year, but more than 112,000 people are on organ waiting lists, according to figures from the Organ Procurement and Transplantation Network.

The guidelines could affect a wide swath of potential donors, particularly younger people. About a quarter of women and nearly 30 percent of men ages 20 to 24 said they had two or more sexual partners in the past 12 months, according to a 2006-2008 report by the National Center for Health Statistics.

When tragic deaths occur, those are precisely the people who should donate their organs, if possible, Giacoma said.

“If you have a [donor] that’s 19 years old and he had multiple partners, we’ll have to tell the recipient, this is a high-risk organ,” she said.

The sexual partner tally is only one of several new factors that could tag a potential donor as being at increased risk of infection. It’s part of a larger set of guidelines that would update 1994 Public Health Service policies for preventing transmission of HIV through human tissue and organs.

“Our priority here is patient safety,” said Kuehnert, who noted that the guidelines describe "increased risk," not "high risk," of infection. "[Patients] should know if they’re getting an organ at elevated risk."

The 1994 guidelines exclude certain groups as donors, including men who have had sex with other men within the past five years, people who’ve used IV drugs or exchanged sex for money or drugs in the past five years, hemophiliacs, those exposed to HIV, and people who’ve had sex with anyone in those categories. They also limit people who’ve been incarcerated.

The new plan calls for the first-ever guidelines for testing living donors and it adds hepatitis B and hepatitis C to the list of must-test viruses, along with HIV, Kuehnert said. As it stands now, only HIV is included in the guidelines, though most organ transplant centers do test for a range of other potential diseases.

The proposal also calls for use of the most sensitive tests available to detect infection and for shorter testing windows to avoid transmitting infections, which occurs in an estimated 1 percent of transplant cases and has been fatal, Kuehnert said.

Between 2007 and 2010, the CDC participated in more than 200 investigations of suspect unexpected transmission of infections including HIV and hepatitis B and C, with dozens of cases confirmed, Kuehnert added.

The risk of infection from organs may be rare, but it’s real. Helen Boucher’s husband, George, 54, of Pawtucket, R.I., died in 2005 after receiving a kidney tainted with a rare infection traced back to a virus from the donor’s pet hamster. The new guidelines wouldn’t have helped detect the Lymphocytic
Choriomeningitis virus—known as LCMV—but Helen Boucher, now 61, said preventing the trauma her family endured is worth any extra scrutiny.

"My gut feeling is if you want to be a donor, you're doing a wonderful thing, but you also have to think about what could happen to the recipient," she said. "If I'm willing to be a donor, I'm willing to answer any of those questions that someone is going to ask of me."

The proposed guidelines shorten the time frame for many of the higher-risk behaviors from five years to one year. But they also classify as risky people who have used kidney dialysis during that time; people who have snorted cocaine or heroin nasally; those who've been in prison, jail or juvenile detention centers for more than three consecutive days in the past year; those who currently have or who have been treated for syphilis, gonorrhea or genital ulcers in the past year and people who have immigrated to the United States within the last year from a country with a high prevalence of hepatitis B.

Other aspects of the plan have drawn fire from transplant experts who object to tests that might be too expensive and too slow for all centers to administer.

But it’s the new emphasis on two or more sexual partners that has ignited most ire, judging from public comments about the proposal being accepted through Dec. 21 at www.regulations.gov.

“I am opposed to the guidelines as written,” wrote Dr. John Radomski, chief of surgery at Our Lady of Lourdes Medical Center in Camden, N.J. “The list of high risk behavior seems way too broad.”

CDC officials downplayed the controversy, saying that the proposal is a draft and can be changed, particularly if there’s strong evidence to support any alteration. They said the primary goal is to obtain as much information about transplanted organs as possible, whether that comes from personal histories or advanced screening tests.

Using a set of behaviors to gauge risk makes sense, Kuehnert said, and studies suggest that having more than one sexual partner raises the risk of infection.

“We can quibble about whether it should be two sexual partners or three or five or 10, but we’ll have to have a cut-off point,” he said.

Should donors who had sex with more than two people in a year be considered high risk?

**Latin America Progresses in Curbing AIDS, but Still Has Long Way to Go**

*Xinhua News Agency*, (12.01.2011) — Marja Wallengren

The annual number of new HIV infections in Latin America has changed relatively little in recent years, the UN reported ahead of World AIDS Day. Following steady declines after 1996, new infections have since the early 2000s leveled off, with 92,000 new cases and 58,000 AIDS-related deaths reported in 2009.

“In Central and South America, the number of deaths has stabilized, but there is no indication yet of decline,” said a regional UNAIDS spokesperson.

An average 54 percent of pregnant women with HIV are receiving antiretroviral therapy, the report said. New infections among children under 15 are declining, from about 47,000 in 2001 to 42,000 in 2010.

The number of people with HIV in the region has grown from 1.1 million in 2001 to 1.4 million in 2009, the report said. Overall prevalence is about 0.5 percent.

“In most of the HIV epidemics in this region, HIV is spreading predominantly in and around networks of men who have sex with men,” the report said. “Few national HIV programs focus sufficiently on preventing and treating HIV infection among [MSM]. Of the 12 countries reporting spending on prevention activities, only Peru directed more than 5 percent of its HIV prevention spending” toward MSM.

Social stigma has kept the region’s epidemic among MSM “hidden and unacknowledged,” though stigma also is directed against sex workers and their clients, UNAIDS noted.

To access the report, visit:

**UGA Study: Higher Pregnancy and Birth Rates in States with Abstinence-Only Sex Education Programs in Schools**

*Atlanta Journal-Constitution*, (11.30.2011) — Maureen Downey

An evaluation of 48 states finds those that mandate abstinence-only sex education in public schools have considerably higher rates of teenage pregnancy and births than those with more comprehensive programs, according to University of Georgia investigators.
Lead author Kathrin Stanger-Hall, an assistant professor of plant biology and biological sciences in the Franklin College of Arts and Sciences, said the study provides the first large-scale evidence that the type of sex education provided in public schools can significantly impact teen pregnancy rates.

In addition to teen pregnancy rates and sex education methods, Stanger-Hall and David Hall, second author and assistant professor of genetics in Franklin, examined the influence of socioeconomic status, education level, access to Medicaid waivers, and ethnicity of each state’s teen population—all factors that could potentially impact teen pregnancy rates.

Yet after adjusting for these, the significant relationship between sex education methods and teen pregnancy remained: States that had laws or policies emphasizing abstinence had, on average, higher teenage pregnancy and birth rates. States with the lowest teen pregnancy rates were those that used comprehensive sex education—covering abstinence alongside lessons about condom use, contraception, and/or HIV education.

“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.

“Our analysis adds to the overwhelming evidence indicating that abstinence-only education does not reduce teen pregnancy rates,” Stanger-Hall noted.


India Has Half of Asia's HIV Patients

Xinhua News Agency, (12.01.2011)—
India is home to 49 percent of Asia’s 4.8 million people with HIV, according to a joint report from UNICEF and the World Health Organization. The Hindu, a New Delhi-based daily newspaper, published the statistics on World AIDS Day. The report notes that among sex workers, the HIV infection rate fell from 25 percent to 13 percent between 2004 and 2009 in Karnataka state, and from 45 percent to 13 percent between 2004 and 2010 in Mumbai. During the past five years, however, there was a dramatic increase in the proportion of pregnant women testing HIV-positive, indicating more preventive activities are needed.

Fake, Poor-Quality Drugs Boosting Malaria Drug Resistance In Southeast Asia, U.S. Experts Say

"Fake or poor quality malaria drugs are boosting resistance in parts of southeast Asia, a problem that is likely to worsen unless tighter regulations are adopted, U.S. experts said Monday" at a hearing of the House Foreign Affairs Subcommittee on Africa, Global Health, and Human Rights, Agence France-Presse reports. "Drug resistance to the most effective drug available, artemisinin-based combination therapy, is developing and has been recognized in southeast Asia," Regina Rabinovich, director of infectious diseases at the Bill & Melinda Gates Foundation, said, according to the news service. "Resistance is being noticed on the Thai, Cambodian, Burmese borders and resistance is likely to increase."
Roger Bate of the American Enterprise Institute said, AFP notes. "In addition to tougher regulations, researchers need to focus on developing new drugs against malaria, and consider making sure they cannot be sold or distributed as mono-therapies, the panelists urged," according to the news service (Sheridan, 12/5).

Reuters Examines Role Of Family Planning At Durban Climate Change Talks

"[W]ith studies suggesting that 215 million women around the world want—but cannot get—effective contraception, making sure birth control methods are available to those who want them could be one of the cheapest, fastest and most effective ways of addressing climate change, experts said at the U.N. climate conference in Durban" this week, AlertNet reports. "But getting U.N. climate negotiators to even mention the controversial issue is nearly as difficult as getting them to agree on a long-delayed new global climate treaty," the news agency adds.

"One of the problems is that successfully lowering birth rates—particularly in the countries with the highest growth—needs to happen alongside a range of other interventions, said Dr. Helen Rees, a reproductive health expert at the University of Witwatersrand in Johannesburg," Reuters writes, listing future family security, low child survival rates, and lack of education as issues that need to be addressed (Goering, 12/5).
University of Leicester study fundamentally alters our understanding of lung growth
Research findings challenges medical textbooks

A ground-breaking international study into the ways lungs grow and develop has challenged existing medical understanding that our lungs are completely formed by the age of three.

The researchers, led by a team at the University of Leicester, put forward a theory for the first time based on research evidence that new air sacs, called alveoli, are constantly being formed. This contradicts information in most medical textbooks that explain that the tiny air sacs begin to develop before birth (around the 6th month of pregnancy) and continue to increase in number until the age of about 3 years.

Dr. Manjith Narayanan, one of the leaders of the study from the University of Leicester, said: "It was believed that there was no further increase in the number of alveoli beyond that age, and that the existing alveoli just expanded as the lungs grew bigger until final adult size was reached."

"Our study has challenged this by suggesting that new alveoli continue to be formed as the lungs grow."

The study, published online ahead of print in the American Journal of Respiratory and Critical Care Medicine, was a collaboration between researchers in the Department of Infection, Immunity and Inflammation, University of Leicester, the Department of Physics and Astronomy, University of Nottingham, and the University of Bern. It was funded by The Wellcome Trust.

The researchers studied over 100 healthy volunteers aged between 7 and 21 years. Each volunteer had a range of breathing tests in Leicester, and was then accompanied to Nottingham for a special magnetic resonance (MR) scan, during which they breathed in hyperpolarised helium and held their breaths.

Dr. Narayanan, a Clinical Research Fellow, explains:

"The helium is hyperpolarised, which means that the molecules all line up in one direction and it then behaves like a magnetised gas. Within the scanner, we can measure how the magnetism decays, and this in turn depends on the size of the air sacs – alveoli – which contain the helium. The technique is safe and not painful or uncomfortable in any way."

Senior Lecturer at Leicester Dr. Caroline Beardsmore describes the study:

"We studied small children, whose lungs contain approximately one litre of air, and full-grown adults with lung volumes of around four litres. We found very little difference in the size of the alveoli across everyone we studied. If the size of the alveoli are hardly changing, this can only mean one thing – as our lungs increase in size, we must be growing new alveoli."

Professor Mike Silverman, Emeritus Professor of Child Health at Leicester, adds:

"This research has important implications. If we can continue to develop new alveoli beyond early childhood, going on through adolescence, there is the potential for lung repair following injury that was never realised before. Conversely, external factors (possibly including inhaled pollution) could have a negative impact on lung development. We now have the basis for looking at many factors with the potential to impact on lung health in the future."

Paper published

Acquired Traits Can Be Inherited Via Small RNAs
ScienceDaily (Dec. 5, 2011) — Columbia University Medical Center (CUMC) researchers have found the first direct evidence that an acquired trait can be inherited without any DNA involvement. The findings suggest that Lamarck, whose theory of evolution was eclipsed by Darwin’s, may not have been entirely wrong.
The study is slated to appear in the Dec. 9 issue of Cell.

"In our study, roundworms that developed resistance to a virus were able to pass along that immunity to their progeny for many consecutive generations," reported lead author Oded Rechavi, PhD, associate research scientist in biochemistry and molecular biophysics at CUMC. "The immunity was transferred in the form of small viral-silencing agents called viRNAs, working independently of the organism's genome."

In an early theory of evolution, Jean Baptiste Larmarck (1744-1829) proposed that species evolve when individuals adapt to their environment and transmit those acquired traits to their offspring. For example, giraffes developed elongated long necks as they stretched to feed on the leaves of high trees, an acquired advantage that was inherited by subsequent generations. In contrast, Charles Darwin (1809-1882) later theorized that random mutations that offer an organism a competitive advantage drive a species' evolution. In the case of the giraffe, individuals that happened to have slightly longer necks had a better chance of securing food and thus were able to have more offspring. The subsequent discovery of hereditary genetics supported Darwin's theory, and Lamarck's ideas faded into obscurity.

However, some evidence suggests that acquired traits can be inherited. "The classic example is the Dutch famine of World War II," said Dr. Rechavi. "Starving mothers who gave birth during the famine had children who were more susceptible to obesity and other metabolic disorders—and so were their grandchildren." Controlled experiments have shown similar results, including a recent study in rats demonstrating that chronic high-fat diets in fathers result in obesity in their female offspring.

Nevertheless, Lamarckian inheritance has remained controversial, and no one has been able to describe a plausible biological mechanism, according to study leader Oliver Hobert, PhD, professor of biochemistry and molecular biophysics and a Howard Hughes Medical Institute Investigator at CUMC. Dr. Hobert suspected that RNA interference (RNAi) might be involved in the inheritance of acquired traits. RNAi is a natural process that cells use to turn down, or silence, specific genes. It is commonly employed by organisms to fend off viruses and other genomic parasites. RNAi works by destroying mRNA, the molecular messengers that carry information coded in a gene to the cell's protein-making machinery. Without its mRNA, a gene is essentially inactive.

RNAi can be also triggered artificially by administering exogenous (externally derived) dsRNA. Intriguingly, the resultant gene-silencing occurs not only in the treated animal, but also in its offspring. However, it was not clear whether this effect is due to the inheritance of RNAs or to changes in the organism's genome—or whether this effect has any biological relevance.

To look further into these phenomena, the CUMC researchers turned to the roundworm (C. elegans). The roundworm has an unusual ability to fight viruses, which it does using RNAi.

In the current study, the researchers infected roundworms with Flock House virus (the only virus known to infect C. elegans) and then bred the worms in such a way that some of their progeny had nonfunctional RNAi machinery. When those progeny were exposed to the virus, they were still able to defend themselves. "We followed the worms for more than one hundred generations—close to a year—and the effect still persisted," said Dr. Rechavi.

The experiments were designed so that the worms could not have acquired viral resistance through genetic mutations. The researchers concluded that the ability to fend off the virus was "memorized" in the form of small viral RNA molecules, which were then passed to subsequent generations in somatic cells, not exclusively along the germ line.

According to the CUMC researchers, Lamarckian inheritance may provide adaptive advantages to an animal. "Sometimes, it is beneficial for an organism to not have a gene expressed," explained Dr. Hobert. "The classic, Darwinian way this occurs is through a mutation, so that the gene is silenced either in every cell or in specific cell types in subsequent generations. While this is obviously happening a lot, one can envision scenarios in which it may be more advantageous for an organism to hold onto that gene and pass on the ability to silence the gene only when challenged with a specific threat. Our study demonstrates that this can be done in a completely new way: through the transmission of extrachromosomal information. The beauty of this approach is that it's reversible."

Any therapeutic implications of the findings are a long way off, Dr. Rechavi added. "The basic components of the RNAi machinery exist throughout the animal kingdom, including humans. Worms have an extra component, giving them a much stronger RNAi response. Theoretically, if that component
could be incorporated in humans, then maybe we could improve our immunity and even our children’s immunity.”

The CUMC team is currently examining whether other traits are also inherited through small RNAs. "In one experiment, we are going to replicate the Dutch famine in a Petri dish,” said Dr. Rechavi. "We are going to starve the worms and see whether, as a result of starvation, we see small RNAs being generated and passed to the next generation."

**Journal Reference:**

**“Secretive” Arab world faces HIV epidemic**

**BEIRUT:** In an Arab world rife with social stigma, government inaction and often limited access to education and medical care, experts warn that an HIV epidemic is on the rise. “In the Middle East and North Africa, the HIV epidemic has been on the rise for the past decade,” said Aleksandar Sasha Bodiroza, HIV/AIDS adviser at the United Nations Population Fund (UNFPA).

“The number of people needing treatment in the region has spiked from approximately 45,000 in 2001 to nearly 160,000 in 2010,” Bodiroza told AFP. “This has put the Middle East and North Africa among the top two regions globally with the fastest growing HIV epidemic.” A United Nations report released this month said the number of people becoming infected with HIV has slowed worldwide, with AIDS-related deaths also on the decline as access to treatment becomes more widespread.

But the Arab world has been slow to catch up. Here, HIV contraction rates and AIDS-related deaths are increasing as public awareness, government response and access to adequate medical services have been slow to progress. While there is little reliable data on the Middle East and North Africa, the United Nations estimates between 350,000 and 570,000 people live with the HIV virus in the region, home to a population estimated at more the 367 million.

One study, published recently on the open access Public Library of Science, put infection rates among men who have sex with men at 5.7 per cent in Egypt’s capital Cairo and at 9.3 per cent in the Sudanese capital Khartoum.

And while some countries have begun to take small steps towards fighting a growing but hushed problem, shame and stigma show very little sign of waning in a region where same-sex relationships and premarital sex are often a crime.

That stigma has become a fact of life for one young man in Beirut, reached through a group that provides free support for people who are HIV-positive or suffer from AIDS. “If I were to sum it up in one word, I would say my life is one big secret,” said the 29 year old, who has known he is HIV-positive for three years.

“While I came out to my family a long time ago, this is something I have not shared with them. I could never burden them with that.” Infection is typically concentrated among high-risk groups, including injecting drug users, men who have sex with men and sex workers and their clients.

“Life for someone carrying the HIV virus is very difficult… they suffer an inability to talk about the disease freely with people who are close to them, and we have cases where individuals were kicked out of the family,” said Brigitte Khoury, clinical psychologist at the American University of Beirut Medical Centre.

“So while some families do offer support, it’s mainly a life of secrecy, deception and living in fear of the worst.”That fear, experts say, is often what keeps HIV-positive individuals from seeking treatment.

“Stigma and discrimination are among the primary reasons that people living with HIV or key populations at higher risk of HIV infection do not have access to essential HIV services,” Bodiroza said. “These two factors also limit the ability of governments and civil society to provide services.” Many states in the Arab world require that foreigners take an Aids test before issuing visas or residency permits. Making headlines this month was the case of a South African journalist who was deported from Qatar after being diagnosed with HIV and sacked by the satellite network Al-Jazeera.

Section27, a public interest legal group based in South Africa, has asked the country’s delegation to the International Labour Organisation to file a complaint against Qatar. But some more liberal countries in the region have begun to publicise the problem, with a media campaign in Egypt and Lebanon hitting the airwaves and billboards last month. The “Let’s Talk” campaign, which runs until the end of December, is organised by UNFPA in partnership with the two countries’ health ministries, and encourages people to be tested.
The campaign, which in Lebanon stars a former beauty queen and wildly popular band Mashrou3 Leila, also supplies a list of free and anonymous testing centres for both countries. But despite the tentative progress, experts say governments are less likely than ever to turn their attention to the rising epidemic in a region gripped by political upheaval.

“The common thread that links all countries in the region is the impact of stigma and discrimination, which are (among) the primary reasons that people living with HIV or at-risk populations do not have access to essential services,” said Bodiroza. “Without strong leadership, it is unlikely that these issues will be fully or properly addressed.”

AIDS Still Carries a Strong Stigma in Africa

Deutsche Presse-Agentur, (12.07.2011)

Stigma and discrimination remain problems for people with HIV/AIDS in Africa, experts and advocates said during the 16th International Conference on AIDS and STIs in Africa (ICASA), which runs through Thursday in Addis Ababa, Ethiopia.

“In Africa, many of those affected start taking antiretrovirals far too late, and this is largely because of the widespread stigma,” said Nils Grede, an AIDS expert with the UN World Food Program. “People just don’t want to know that they are sick, because they are frightened of the reaction of their family and friends.”

Ahead of ICASA, groups representing LGBTs ran into strong opposition from religious leaders in the conference’s Christian host-country, and scarcely a hotel in the city was prepared to host LGBT meetings. Homosexual relations are banned in most of the region, and where legal they are associated with HIV/AIDS, even though the epidemic in Africa is primarily heterosexual. Lack of awareness about the risks of unprotected sex is widespread, especially in rural areas.

HIV/AIDS support groups in Africa are increasingly being formed. Outside Nairobi, Kenya, in Kibera—one of Africa’s largest slums—the Power Woman Group helps women with HIV. About 20 women and 72 children in the group make items such as handbags, T-shirts, and sandals, which they sell in order to buy food and accumulate savings. The US Agency for International Development-funded Urban Garden project in Ethiopia also helps women and children grow fruit and vegetables, promoting nutrition and a steady income.

The Number of Recent Sex Partners Among Bisexual Men in the United States

Perspectives on Sexual & Reproductive Health Vol. 43; No. 3; doi:10.1363/1315111, (09.2011)– William L. Jeffries IV

“Little is known regarding bisexual men’s number of recent sex partners, a risk factor for HIV and other STDs. Furthermore, it is unclear if bisexual men have more partners than heterosexual or homosexual men, and whether partner number varies by measures of sexual behavior, identity, and attraction,” according to the study’s introduction.

Using data from the 2002 National Survey of Family Growth, sexual orientation—separately defined by sexual behavior during the previous year, identity, and attraction—was examined for 3,875 sexually active men ages 15-44. Chi-square and t tests looked at differences in background characteristics, behavioral risk factors, and number of prior-year sex partners by sexual orientation according to each definition. Multivariate ordinary least-squares regression assessed predictors of partner numbers.

After controlling for sexual identity and attraction, behaviorally bisexual men were predicted to have had 3.1 more past-year partners than behaviorally heterosexual men and 2.6 more than behaviorally homosexual men. Controlling for sexual identity and behavior, bisexual-attracted men had 0.7 fewer partners than homosexual-attracted men. A model including background characteristics and behavioral risk factors predicted behaviorally bisexual men to have had 2.5-2.6 more partners than others. “Neither bisexual identity nor bisexual attraction independently predicted the number of recent partners,” according to the results.

“The way in which bisexuality relates to men’s number of recent sex partners depends on how sexual orientation is measured. Interventions to reduce behaviorally bisexual men’s number of partners will likely lessen their risk for HIV and other STDs,” concluded the study.
Fatal Snakebites 'Vastly Underreported,' Researchers Report At Annual ASTMH Meeting

Fatal snakebites worldwide have been vastly underreported because many die before seeking or reaching medical care, researchers from the Biodiversity and Climate Research Centre in Frankfurt, Germany, reported on Monday at the American Society of Tropical Medicine and Hygiene's (ASTMH) annual meeting, UPI.com writes (12/5). NPR's "Shots" blog notes that, "even at the low end of estimates, deaths from snakebites would exceed those from better-known scourges, such as cholera, dengue fever and Chagas disease," according to researchers at the symposium (Hensley, 12/6).

"The World Health Organization estimates that up to five million people suffer from snakebites each year, resulting in 300,000 cases of permanent disability and about 100,000 deaths," an ASTMH press release states. However, "two recent studies reveal that the magnitude of the problem is far greater than official statistics show," with the actual number of snakebites and related deaths in India and Bangladesh much higher than official figures and estimates, the release notes. "Snakebite victims often do not go to hospitals because they have to travel too far, anti-venom is scarce in many regions, or the treatment can be too expensive," according to the press release (12/5).

NEJM publishes study showing LigoCyte's norovirus vaccine demonstrates protection against illness

Norovirus VLP vaccine is first ever to demonstrate significant protection against acute norovirus gastroenteritis in Phase I/II study

BOZEMAN, Mont., Dec. 7, 2011—LigoCyte Pharmaceuticals, Inc. announced today that its experimental vaccine provided significant protection against norovirus infection and related gastrointestinal illness collectively known as acute gastroenteritis (AGE). Norovirus infection, sometimes referred to as "the stomach flu" is one of the most common causes of severe nausea, vomiting, abdominal cramps and diarrhea affecting 21 million Americans annually and is an important contributor to gastrointestinal disease worldwide. This was the first time a vaccine has demonstrated protection against norovirus. No commercially available vaccines or specific therapies currently exist to prevent or treat norovirus infection. The results of the Phase I/II study, conducted with a virus-like particle (VLP) vaccine, were published today in The New England Journal of Medicine. This study was a multi-center trial performed in collaboration with a consortium including Baylor College of Medicine, Cincinnati Children's Hospital, Johns Hopkins University, SNBL CPC, Inc., University of Maryland and The EMMES Corporation.

"This is the first demonstration of protection in humans against what is a widespread and often serious illness and is a big development for the field," said Robert Atmar, M.D., of Baylor College of Medicine and the study's principal investigator. "The number of hospitalizations and the healthcare costs associated with norovirus are staggering; a successful vaccine against norovirus would offer significant protection to patients as well as potential cost reductions for the healthcare system."

"The positive results from this rigorous challenge study demonstrate that norovirus gastroenteritis, which can result in severe illness in many people, can be prevented by vaccination," said Donald P. Beeman, LigoCyte's Chief Executive Officer. "Development of our bivalent intramuscular vaccine is currently underway, and we look forward to the results of upcoming clinical studies of the product."

Specifically, data from the study show:

- In the 77 adults who completed the trial per its original protocol, vaccination decreased the incidence of gastroenteritis due to norovirus from 69.2 percent to 36.8 percent, a 47 percent reduction in illness compared to subjects receiving placebo (95% CI 15.2%-66.6%; p=.006).
- Subjects receiving vaccine scored lower on a severity of illness scale (p=.011).
- Immunization with the VLP vaccine increased antibody titers that blocked VLP binding to histo blood group antigens in vitro.
- Higher functional antibody responses in all subjects correlated with increased protection against illness. A serum BT50 titer of 200 or greater was associated with a 72.2 percent reduction in virus-associated illness (odds ratio of 8.1 (95% CI 2.1-31.2)).
- Adverse events occurred with similar frequency among vaccine and placebo subjects. The most common symptoms after vaccination included nasal congestion, stuffiness and sneezing.

About Norovirus Illness

Norovirus gastroenteritis is a widespread and potentially severe illness characterized by the acute onset of nausea, vomiting, abdominal cramps, diarrhea and occasionally fever. Noroviruses are highly infective...
Trumatic injury sets off a 'genomic storm' in immune system pathways

Massive, consistent changes in inflammatory gene expression seen in trauma, burns

Serious traumatic injuries, including major burns, set off a "genomic storm" in human immune cells, altering around 80 percent of the cells' normal gene expression patterns. In a report to appear in the December Journal of Experimental Medicine, members of a nationwide research collaborative describe the initial results of their investigation into the immune system response to serious injury, findings which have overturned some longstanding assumptions.

"We have discovered there is a highly reproducible genomic response to injury that is essentially the same – no matter the patient's individual genetic background, whether the injury was caused by major trauma or serious burns, or if recovery is rapid or complicated," says Ronald G. Tompkins, MD, ScD, director of the Sumner Redstone Burn Center at Massachusetts General Hospital (MGH) and principal investigator of the study. "When this project was organized more than a decade ago, the question was raised whether responses would differ so much from person to person that no patterns would appear. It is amazing how similar our responses to injuries like serious burns or trauma actually are."

About the Phase I/II Norovirus Vaccine and Challenge Study

The Phase I/II randomized, double blind, multi-center, placebo-controlled safety and efficacy study was designed to evaluate the norovirus monovalent GI.1 VLP vaccine versus placebo in approximately 90 healthy adult volunteers between the ages of 18 and 50 years. The study consisted of two stages: the vaccination stage with post-vaccination follow-up, followed by the challenge stage, in which subjects were exposed to the live virus, with post-challenge follow-up. Subjects received a two-dose intranasal regimen of either the vaccine or placebo on days 0 and 21 and were evaluated for vaccine safety and immune responses. On or after study day 42, subjects were admitted to an inpatient nursing unit, challenged with live norovirus, held in the unit for at least four days following challenge and then followed for post-challenge safety and efficacy with multiple clinical assessments and collection of stool specimens. The study was conducted at Baylor College of Medicine, the University of Cincinnati and Cincinnati Children’s Hospital Medical Center, the Johns Hopkins School of Medicine and SNBL CPC, Inc., a clinical research organization in Baltimore, Md.

About LigoCyte's Intranasal Norovirus Vaccine Candidate

LigoCyte's intranasal norovirus vaccine is a dry powder formulation containing virus-like particle (VLP) antigens representing the live virus while lacking the ability to reproduce or cause illness. VLPs mimic the natural virus by preserving the authentic structure of the viral capsid, the shell of protein that protects the nucleic acid of a virus. LigoCyte's vaccine formulation also includes the adjuvant Monophosphoryl Lipid A, provided under license from GlaxoSmithKline PLC (NYSE: GSK), and the nasal vaccine incorporates chitosan. This application of chitosan (ChiSys®) has been licensed from Archimedes Development Ltd. (1) A clinical study of an intramuscular bivalent formulation of LigoCyte's norovirus vaccine is ongoing. Preliminary results from that study were presented by one of the principal investigators in the study, Sharon Frey, M.D., from the Saint Louis University Center for Vaccine Development at the Saint Louis University School of Medicine, at the Infectious Diseases Society of America (IDSA) 2011 Annual Meeting on October 21 in Boston, Mass. Data presented at the meeting indicate that the intramuscular vaccine induces immune responses that are even more potent than the nasal formulation of the vaccine.

Traumatic injury sets off a 'genomic storm' in immune system pathways
The genomic changes seen in the trauma and burn patients were essentially the same, with immediate increased expression of pathways involved with inflammation and with the first-response innate immune system along with simultaneous suppression of adaptive immune pathways. Over time these patterns changed only in terms of intensity and duration, which runs counter to a widely accepted theory that the initial pro-inflammatory response would be followed by an anti-inflammatory response that opens the door to complications like sepsis and organ failure. Instead the only differences between patients with and without complications were in the magnitude of gene expression changes and how long they lasted. Even the volunteers who received bacterial toxin, whose symptoms lasted for only 24 hours, had similar changes in 40 percent of the gene pathways that were altered in the seriously injured patients.

"Burn patients may take months to years to recover from their injuries, while trauma patients who are going to recover usually do so within a month. So it was entirely unexpected that gene expression patterns in burns and trauma patients changed in exactly the same directions 91 percent of the time," Tompkins explains. "Also if you consider two patients with identical injuries from a serious auto accident – a 20-year old who is ready to go home in a week and a 55-year-old who is still in the ICU and on a ventilator at the same point in time – it would be logical to think that the complications suffered by the older patient must have a genome-based difference. But it turns out that the gene expression changes are the same and the only differences is how much they change and how soon they return to normal. There are no new genes or pathways recruited to deal with those serious complications beyond those already involved in the body's basic response to serious injury.

"With this knowledge we can begin to design therapies to promote improvement in patients who would otherwise have complicated recoveries," he adds. "We also can look at whether measuring genomic changes soon after injury can help us predict which patients will recover well and which will need the maximal treatment typically delivered in ICUs, which in addition to being expensive, can sometimes be harmful." Tompkins is the Sumner M. Redstone Professor of Surgery at Harvard Medical School.
Oxidative stress is considered to be involved in a multitude of pathogenic processes and is also implicated in the process of aging. For the first time, scientists of the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) have been able to directly observe oxidative changes in a living organism. Their findings in fruit flies raise doubts about the validity of some widely held hypotheses: The research team has found no evidence that the life span is limited by the production of harmful oxidants.

Arterial calcification and coronary heart disease, neurodegenerative diseases such as Parkinson's and Alzheimer's, cancer and even the aging process itself are suspected to be partially caused or accelerated by oxidative stress. Oxidative stress arises in tissues when there is an excess of what are called reactive oxygen species (ROS). "However, up to now, nobody was able to directly observe oxidative changes in a living organism and certainly not how they are connected with disease processes," said Associate Professor (PD) Dr. Tobias Dick of DKFZ. "There were only fairly unspecific or indirect methods of detecting which oxidative processes are really taking place in an organism."

For the first time, Tobias Dick and his co-workers have been able to observe these processes in a living animal. Jointly with Dr. Aurelio Teleman (also of DKFZ), they introduced genes for biosensors into the genetic material of fruit flies. These biosensors are specific for various oxidants and indicate the oxidative
status of each cell by emitting a light signal—in realtime, in the whole organism and across the entire life span.

In the fly larvae, the investigators already discovered that oxidants are produced at very differing levels in different tissue types. Thus, blood cells produce considerably more oxidants in their energy plants, the mitochondria, than, for example, intestinal or muscle cells. In addition, the larvae's behavior is reflected in the production of oxidants in individual tissues: The researchers were able to distinguish whether the larvae were eating or moving by the oxidative status of the fat tissue.

Up to now, many scientists have assumed that the aging process is associated with a general increase in oxidants throughout the body. However, this was not confirmed by the observations made by the investigators across the entire life span of the adult animals. They were surprised that almost the only age-dependent increase in oxidants was found in the fly's intestine. Moreover, when comparing flies with different life spans, they found out that the accumulation of oxidants in intestinal tissue even accelerated with a longer life span. The group thus found no evidence supporting the frequently voiced assumption that an organism's life span is limited by the production of harmful oxidants.

Even though comprehensive studies have failed to provide proof until the present day, antioxidants are often advertised as a protection against oxidative stress and, thus, health-promoting. Dick and colleagues fed their flies with N-acetyl cysteine (NAC), a substance which is attributed an antioxidant effect and which some scientists consider suitable for protecting the body against presumably dangerous oxidants. Interestingly, no evidence of a decrease in oxidants was found in the NAC-fed flies. On the contrary, the researchers were surprised to find that NAC prompted the energy plants of various tissues to significantly increase oxidant production.

"Many things we observed in the flies with the help of the biosensors came as a surprise to us. It seems that many findings obtained in isolated cells cannot simply be transferred to the situation in a living organism," said Tobias Dick, summarizing their findings. "The example of NAC also shows that we are currently not able to predictably influence oxidative processes in a living organism by pharmacology," he adds. "Of course, we cannot simply transfer these findings from fly to man. Our next goal is to use the biosensors to observe oxidative processes in mammals, especially in inflammatory reactions and in the development of tumors."

Journal Reference:

AFRICA: HIV-positive women still confused about infant-feeding choices

For most HIV-positive mothers in Africa, exclusive breastfeeding may be the most practical option
ADDIS ABABA, 9 December 2011 (PlusNews)—The latest guidelines on infant-feeding options for HIV-positive mothers in Africa have not been disseminated in many countries, leaving women dangerously confused about the best nutritional path to protect their children from contracting the virus, a new report shows.

The UN World Health Organization’s (WHO) 2010 guidelines recommend exclusive breastfeeding with an antiretroviral (ARV) treatment intervention for the first six months of a child's life to reduce transmission, and continued breastfeeding—with complementary feeding—until the child is at least a year old. Alternatively—where it is acceptable, feasible, affordable, sustainable and safe—WHO recommends complete avoidance of all breastfeeding.

For HIV-positive mothers in most sub-Saharan African nations, exclusive breastfeeding is the most practical option. According to a large African study, Kesho Bora, giving HIV-positive mothers a combination of three ARVs during pregnancy, delivery and breastfeeding cuts HIV infections in infants by 43 percent by the age of 12 months and reduces transmissions during breastfeeding by 54 percent compared with WHO’s 2006 recommendations, where ARV drug regimens ended at delivery.

"The six months of exclusive breastfeeding is what is crucial for mothers to understand—that not doing it is what raises the child’s HIV risk; but we are finding that while many countries have officially adopted the WHO guidelines, they have not trickled down, and health centres, policy-makers and communities are still unclear on what advice to give mothers," said Aditi Sharma, of the International Treatment Preparedness Coalition (ITPC), and coordinator of a report, The Long Walk: Ensuring comprehensive care for women and families to end vertical transmission.

Based on new research by community health workers from Cameroon, Cote d’Ivoire, Ethiopia and Nigeria, the report—launched at the 16th International Conference on AIDS and STIs in Africa (ICASA) in
Addis Ababa, Ethiopia—found that prevention of mother-to-child transmission programmes were focused too narrowly on the provision of ARVs to HIV-positive pregnant women, rather than more comprehensive approaches that involved family planning, maternal healthcare and exclusive breastfeeding.

**Confusion**

"Nutritional counselling doesn't exist in rural areas," the report quoted one Cameroonian woman as saying. "Health personnel are not trained and women do not know how to care for their children."

In Cote d’Ivoire, the report found that national guidelines did not meet the most recent WHO recommendations on infant feeding.

Although the Nigerian government had revised guidelines to comply with the WHO, consensus did not exist in support of the recommendations, and some clinicians and researchers continued to oppose breastfeeding because they believed it deliberately exposed babies to possible HIV infection. Several focus group participants indicated they assumed that replacement feeding was preferable to breastfeeding, and that it had been recommended by health practitioners.

"The guidance on infant-feeding options needs to urgently get into the curriculum and training of health workers and other people who support community healthcare, such as traditional birth attendants," said Sharma, adding that efforts needed to be made to support mothers to exclusively breastfeed their children.

"It is not enough to issue guidelines—in places where women may complain of insufficient breast milk or inadequate nutrition, they need nutritional support to ensure they can continue to exclusively breastfeed," she added.

**Supporting partners**

Beatrice Ochieng, author of a study on infant feeding choices in poor settings in the Kenyan capital, Nairobi, noted that just 23 percent of 357 women in the study discussed their chosen feeding option with their partners. "There is a need to support partner involvement through partner counselling and testing, during antenatal and postnatal care," she said.

According to Ncumisa Vika, who works with the Elizabeth Glaser Paediatric AIDS Foundation (EGPAF) in South Africa, male involvement in reproductive health services, including PMTCT, remains low, creating challenges and barriers around disclosure of HIV-positive status to a partner, psychosocial support, adherence to treatment, and infant-feeding decisions. In 2010, in collaboration with community health organizations in South Africa’s Tshwane District, EGPAF was able to send invitation letters to the partners of all HIV-positive women who attended antenatal clinics, which boosted male participation in reproductive and family health matters.

Overall, ITPC’s Sharma said, there was a need for more comprehensive delivery prevention of mother-to-child services in Africa. "Countries must ensure that policy filters down to the women in all aspects of PMTCT—from HIV prevention for women to family planning, to the best ARV prophylaxis option to proper infant feeding to proper healthcare for the mother, child and family," she said. "It is the only way we can achieve the 2015 targets of reducing vertical transmission by 90 percent."

**Treatment switches after CD4 count decline reduce risk of death by 75% in Zambia, Malawi**

Carole Leach-Lemens
Published: 09 December 2011
Mortality was reduced by about 75% among adults experiencing immunological failure according to the World Health Organization (WHO) criteria who switched to a second-line regimen compared to those who remained on a failing regimen in two public sector ART programmes without access to routine viral load monitoring in Zambia and Malawi, researchers report in the advance online edition of AIDS.

Additionally in this collaborative analysis Thomas Gsponer and colleagues on behalf of the Southern African region of the International epidemiological databases to evaluate AIDS (IeDEA-SA) showed the less time spent on a failing regimen the lower the risk of death, HR:0.70 (95%—credible intervals (CI): 0.44-1.09), p=0.11 for each six months of shorter exposure.
An estimated 6.6 million people are now getting ART in resource-poor settings. As access to treatment increases so does the number of people experiencing treatment failure with a corresponding increase in the use of second-line treatment regimens.

Cost and the absence of the necessary laboratory infrastructure preclude the regular use of viral load monitoring in resource-poor settings, especially in rural areas.

Without viral load monitoring immunological (CD4 cell counts) and clinical criteria are used to determine treatment failure. However, the accuracy of such criteria to detect virological failure is poor. This may lead to unnecessary switching with many health care providers reluctant to switch using these criteria. So people are switched later and at lower CD4 cell counts compared to programmes where viral load monitoring is available, note the authors.

The authors chose to examine further the effect of switching to second-line ART on mortality in settings without viral load monitoring.

All adult patients experiencing treatment failure according to WHO immunological criteria from two public sector ART programmes in Lusaka, Zambia and Lilongwe, Malawi were included in the analysis. Clinical and immunological monitoring was done every three to six months. In both sites viral load testing is limited because of cost and operational difficulties.

Criteria for inclusion: all patients 16 years of age and over with immunological failure after January 1, 2004 based on any of the three WHO criteria: 1) CD4 cell counts staying persistently under 100 cells/mm$^3$ 2) a fall of CD4 cell counts below the baseline count and 3) a fall greater than 50% from the peak value.

Marginal structural models and inverse probability weighting of switching to compare mortality between patients who switched and those who did not and between those who switched immediately and those who switched later were used. The authors believe this to be the first study of its kind using this model in a resource-poor setting.

From 2004 to 2009 of the 80,937 patients who started ART, 2411 met the eligibility criteria and experienced failure; 96.1% (2317) from Zambia and 3.9% (94) from Zambia.

Of these 324 (13.4%) were switched to second-line ART during a median of 1.7 years of follow-up. Median CD4 cell count in those who switched was lower at the start of ART and failure compared to those who did not: 80 cells/mm$^3$ compared to 155 cells/mm$^3$, p<0.001 and 77 cells/mm$^3$ compared to 146 cells/mm$^3$, p<0.001, respectively.

In addition to lower mortality, loss to-follow-up was also lower among people who switched compared to those who did not: 14.2 (6.8-25.9) compared to 50.5 (43.2-58.5) per 1000 person years, p<0.001, respectively.

After adjusting for baseline and time-dependent confounders the risk of death among those who switched to a second-line regimen immediately after failure was significantly lower than those who remained on a failing regimen (HR 0.25, 95% CI: 0.09-0.72, p=0.01).

27.2% (655) patients had at least one viral load measured between six months after starting ART and immunological failure. Viral load measurement was more common among those who switched compared to those who did not, but was not statistically significant.

The authors note that ideally a randomised clinical trial should be used to determine the causal effect of switching to second-line treatment among immunologically failing patients. But they caution this is highly improbable since it raises ethical concerns.

So observational data as provided in this study offer the best available evidence to guide and inform clinical practice and public health decisions on when and if to switch, they add.

The authors note that prognostic factors can distort results from observational studies. Inverse probability of treatment weighting was used to adjust for confounding by time-updated CD4 cell counts.

The authors note that while the reduction in death was significant it may have unknowingly included patients who met the immunological failure criteria but had an undetectable viral load.

While two public sector programmes were involved, the authors question how generalisable their findings are. These programmes are equipped with electronic medical records systems, have access to regular CD4 cell counts and are involved in an international collaboration of HIV cohorts. Yet, they nonetheless follow national guidelines for the public health approach common to many programmes in the region.

The authors conclude, “in ART programmes [in sub-Saharan Africa] switching patients to second-line regimens based on WHO immunological failure criteria appears to reduce mortality, with the greatest benefit in patients switching immediately after failure is diagnosed.” –
Adding that targeted viral load may further reduce unnecessary switching and recommend that future studies "investigate at what CD4 cell count levels patients should ideally be switched and should examine long-term outcomes including after second-line failure."

Reference

Texas School Districts Shifting Away from Abstinence-Only Sex Education

**Dallas Morning News**, (11.22.2011)—Terrence Stutz

More than one-quarter of Texas school districts now offer “abstinence-plus” sex education instruction, up from 3.6 percent just three years ago, a new study finds.

The study by the Texas Freedom Network (TFN), a nonprofit liberal group, used survey data from the Texas Education Agency. Seven of the 10 largest school districts in the state — including Fort Worth, Austin and Houston — now teach contraception in addition to focusing on abstinence, according to the survey.

“We are encouraged that local policies are beginning to catch up with public opinion,” said TFN President Kathy Miller, citing a 2010 state poll showing that more than three-fourths of voters favor teaching abstinence-plus.

A 1995 law requires Texas schools that teach sex education to emphasize abstinence, though districts can tailor instruction based on the needs of the students. Until recently, most districts have elected to teach an abstinence-only curriculum.

“We’re seeing the adoption of common-sense sex education policies that deal with a real public health crisis,” said Miller, noting that Texas has the third-highest teen birth rate in the nation.

According to TFN, two factors are driving the shift:

- Changes in the “Worth the Wait” program, which is used in nearly one-fifth of Texas school districts. This curriculum once emphasized abstinence-only but now includes a “robust” discussion of contraception. “Students in districts using Worth the Wait now encounter basic, factual information about contraception and disease prevention,” said the study.
- Growing local support for abstinence-plus programming, particularly from School Health Advisory Councils, which comprise health educators, health care providers and parents.

Nigeria Pushes Ahead with Anti-Gay Bill Despite US Moves

**Agence France Presse**, (12.07.2011)—

Nigeria’s House of Representatives on Wednesday introduced an anti-gay bill despite recent US and UK government moves aimed at supporting LGBT rights internationally. Passed by the Senate last week, the House bill would outlaw same-sex marriage, public displays of same-sex affection and gay organizations.

The prospect of making gay organizations illegal has led some advocates to speculate whether funding to non-governmental organizations fighting HIV/AIDS could be jeopardized.

On Tuesday, President Barack Obama ordered all US government agencies to take steps to encourage foreign nations to respect LGBT rights. However, US foreign policy statements stopped short of any warning that transgressor nations could be stripped of aid. UK Prime Minister David Cameron has warned his government will consider withholding aid from countries that do not recognize LGBT rights.

“We have a culture. We have religious beliefs and we have a tradition. We are black people. We are not white,” said Zakari Mohammed, a lawmaker and spokesperson for the House. Same-sex marriage “is alien to our culture and we can never give it a chance. So if [Western nations] will withhold their aid to us, to hell with them.”

“We live in a democracy, we live in a free country, we live in an independent country,” said Labaran Maku, information minister and cabinet member. “Some of the things that are considered fundamental rights abroad... can be very offensive to African culture.”

Mohammed promised tougher penalties than those proposed in the bill, which now stand at 14 years prison for same-sex marriage, 10 years for abetting same-sex marriage, and 10 years for “any person who... directly or indirectly makes public show of same-sex amorous relationships.”

The House did not debate the bill or set a date to take it up. If approved, it would go to President Goodluck Jonathan for his consideration.
US Urges Shorter Treatment for TB

Agence France Presse, (12.08.2011)—

CDC on Thursday released new recommendations that offer certain populations with latent TB infection a shorter treatment course. Three randomized controlled trials have found “a new combination regimen of isoniazid (INH) and rifapentine (RPT) administered weekly for 12 weeks as directly observed therapy is as effective for preventing TB as other regimens and is more likely to be completed than the US standard regimen of 9 months of INH daily without DOT,” the CDC authors wrote.

A major drawback to the longer, traditional, self-supervised regimens is that they “have completion rates of 60 percent or less in typical settings, attributable largely to the duration of six or more months,” CDC said.

In cases where the TB is thought to be INH-resistant, patients are often given daily rifampin (RIF) for four months. RPT, like RIF, is a rifamycin-class antibiotic approved for TB disease; its use for latent TB infection is off label.

Patients who could benefit from the new, shorter treatment regimen for latent TB infection include otherwise healthy people age 12 and older who have a predictive factor for greater likelihood of TB developing, including recent exposure to contagious TB; conversion from negative to positive on an indirect test for TB (i.e., interferon-gamma release assay or tuberculin skin test); and radiographic findings of healed pulmonary TB; certain precautions are noted. “HIV-infected patients who are otherwise healthy and are not yet taking antiretroviral medications are also included in this category,” CDC said, again with certain precautions noted.

In considering whether a treatment regimen is appropriate, physicians and patients should consider whether there is adequate access to a physician for weekly treatments, how easy or hard it is to get the drugs, and personal preference, CDC said.


To view the full recommendations, visit: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6048a3.htm?s_cid=mm6048a3_w.

Poor Knowledge of HIV in Finland

Helsinki Times, (12.08.2011)—

A survey by the market research company Taloustutkimus revealed large gaps in Finns’ knowledge about HIV/AIDS. More than 60 percent of respondents thought intravenous drug use was the most common route of HIV transmission in Finland; in fact, 90 percent of infections are linked to sexual intercourse.

Two-thirds of participants had never undergone voluntary HIV testing; women reported testing somewhat more frequently than men. The most common reason for not testing was considering oneself not at risk. So far this year, 164 new HIV cases have been recorded. More than 2,000 Finns have HIV, and authorities estimate an additional 1,000 people have the virus but have not been diagnosed. The survey, conducted in November, polled 1,064 people ages 30-39.

HIV Infections in Russia Rise 10 Percent in 2011

Xinhua News Agency, (11.30.2011)—

The number of new HIV cases registered in Russia from January to October this year, 48,363, is almost 10 percent higher than the figure for the same period in 2010, according to health officials. By year’s end, new cases may top 62,000. “Russia has an extremely unfavorable HIV situation,” said Vadim Pokrovsky, chief of the Russian federal AIDS research center. “In the meantime, in the United States and Western Europe the number of new cases has been shrinking.” According to the Itar-Tass news agency, he said the number of new HIV cases in Russia is expected to double in five years. As of Nov. 1, Russia had registered 636,976 confirmed HIV cases, including 104,257 who are deceased. The most affected population group is men ages 25-35.

Examining Visceral Leishmaniasis/HIV Co-Infection In East Africa

In this post in the Global Network for Neglected Tropical Diseases’ (NTDs) ”End the Neglect” blog, Julien Potet, NTD policy adviser at Medecins Sans Frontieres’ Campaign for Access to Essential Medicines, examines the treatment of visceral leishmaniasis among people living with HIV in East Africa. He writes, "With new and better treatment strategies being validated, it is time for East African countries where visceral leishmaniasis is endemic — mainly Sudan, South Sudan, Ethiopia and Kenya — to scale up their capacities for integrated diagnosis and treatment of HIV and visceral leishmaniasis" (12/8).
New disinfection technique could revolutionize hospital room cleaning

A Queen’s University infectious disease expert has collaborated in the development of a disinfection system that may change the way hospital rooms all over the world are cleaned as well as stop bed bug outbreaks in hotels and apartments.

“This is the future, because many hospital deaths are preventable with better cleaning methods,” says Dick Zoutman, who is also Quinte Health Care’s new Chief of Staff. “It has been reported that more than 100,000 people in North America die every year due to hospital acquired infections at a cost of $30 billion. That’s 100,000 people every year who are dying from largely preventable infections.”

Dr. Zoutman has also used this disinfection technology to kill bed bugs. A major U.S. hotel chain has already expressed interest in the technology because of its potential to save the company millions of dollars in lost revenue and infected furniture.

Dr. Zoutman worked in collaboration with Dr. Michael Shannon of Medizone International at laboratories located in Innovation Park, Queen’s University. Medizone is commercializing the technology and the first deliveries are scheduled for the first quarter of 2012.

The new technology involves pumping a Medizone-specific ozone and hydrogen peroxide vapour gas mixture into a room to completely sterilize everything – including floors, walls, drapes, mattresses, chairs and other surfaces. It is far more effective in killing bacteria than wiping down a room.

Dr. Zoutman says the technique is similar to what we now know Mother Nature uses to kill bacteria in humans. When an antibody attacks a germ, it generates ozone and a minute amount of hydrogen peroxide producing a new highly reactive compound that is profoundly lethal against bacteria, viruses and mold.

“It works well for Mother Nature and is working very well for us,” says Dr. Zoutman.

There are other disinfecting technologies that involve pumping gas into a room, but Medizone’s method is the only one that sterilizes as well as surgical instrument cleaning. It also leaves a pleasant smell and doesn’t affect any medical equipment in the room. The entire disinfection process is also faster than other methods – it takes less than one hour.

Dr. Zoutman says the technology could also be used in food preparation areas and processing plants after outbreaks such as listeria and to disinfect cruise ships after an infection outbreak.

Study results on the process are published in the December issue of the American Journal of Infection Control.

Premature Babies Harbor Fewer, but More Dangerous Microbe Types

ScienceDaily (Dec. 8, 2011) — One of the most comprehensive studies to date of the microbes that are found in extremely low-birthweight infants found that hard-to-treat Candida fungus is often present, as well as some harmful bacteria and parasites.

Researchers at the Duke University Medical Center and Nicholas School of the Environment looked at the microbes in 11 premature infants and found much less diversity than in full-term infants.

"The babies' guts were taken over by microbes we know are dangerous if they get into the blood," said senior author Patrick Seed, MD, PhD, assistant professor of pediatrics at Duke. "Even after the babies were no longer on antibiotics, healthier bacteria didn't appear in the babies very quickly. This may be one reason why premature babies are so vulnerable to infections."

All of the premature children were placed on antibiotic treatments after birth, which would wipe out some types of bacteria and yeast, but once they were off the antibiotics and taking food, the researchers expected to see more diversity of bacteria in the babies' developing digestive systems than they found.

The findings were published in PLoS One open-access journal on December 8, 2011.

Five infants had blood infections while three had necrotizing enterocolitis, an infection-related death of bowel tissue, said Seed, who is also with the Jean and George Brumley Jr. Neonatal-Perinatal Research Institute and the Duke Center for Microbial Pathogenesis.

Seed said that while the study babies were colonized mainly by organisms that were found in stool specimens, in some cases they also had infections with Staphylococcus epidermidis, a form of staph infection, that was abundant in many of the babies' digestive tracts.

The bacteria and yeast in the premature babies' digestive tracts are known causes of devastating infections in these babies. The gut seems to be a reservoir for some organisms that form infections, Seed said. Previous to this work, "we only knew the tip of the iceberg," he said.

The researchers used genomic (DNA) typing of the bacteria, fungi, and parasites to determine which types were present.
It's not clear if the newborns are picking up these early infections from their mother's milk, blood, or in other ways, or if the pathogens are from the environment surrounding the infants.

"It's important to know where these pathogens come from so that doctors can possibly manipulate the babies’ environment or their digestive systems," Seed said. He noted that other studies had shown value for giving babies probiotic substances to tip the internal balance toward more favorable bacteria, necessary for immunity and better health.

Seed stressed that certain bacteria and other microbes are helpful for growing babies and their immune systems, so it is important not to do any damage by creating an antiseptic environment.

"It's a question of balance," Seed said. "As vulnerable as these babies are, we still wouldn't want to wipe out all of the bacteria, even all of the potentially harmful bacteria."

Journal Reference:

Monkey Study at HIV Persistence Workshop Offers Hope for Functional Cure
Since December 6th, 215 specialists are meeting in Sint Maarten for the International Workshop on HIV Persistence, Reservoirs and Eradication Strategies. Using a monkey model, Italian researchers show that spontaneous viral control is possible after discontinuing antiretroviral therapy.

Philipsburg, Sint Maarten — December 7, 2011 — The International Workshop on HIV Persistence, Reservoirs and Eradication Strategies is supported by the American National Institute of Health (NIH) and the French Agency for AIDS Research (ANRS).

On this second day of the workshop, a breakthrough towards HIV functional cure was reported by Doctor Andrea Savarino and his team from the Italian Istituto Superiore di Sanita (Rome).

A functional cure is a situation where some HIV genetic material remains in the body but no viral replication is found in the absence of antiretroviral therapy (ART). Usually, discontinuation of ART leads to viremia rebound due to the persistence of long-lived HIV reservoirs.

The experiment used macaques infected with the simian counterpart of HIV named SIVmac251. Eighteen animals received ART and, in some cases, anti-reservoir agents, including five monkeys enrolled in a pilot study of a multidrug ART regimen in combination with auranofin (selectively killing memory T-cells) and the glutathione synthesis inhibitor buthionine sulfoximine (BSO) previously shown to facilitate elimination of the infected cells.

The difference between the viral RNA set point before and after the treatment period was positively correlated with the number of drugs potentially acting against the viral reservoir that the monkeys had received. Extremely low viral set points (< 200 copies/mL) were obtained in three monkeys that had received the additional treatment with BSO, or multidrug ART at viral rebound, and were off ART for more than 100 days.

These data show for the first time that anti-reservoir strategies may result in spontaneous control of viral load in the chronic phase of infection, and pave the way towards a functional cure for AIDS.

About the workshop: The International Workshop on HIV Persistence, Reservoirs and Eradication Strategies is held at the Westin Sint Maarten Hotel, Philipsburg, December 6-9, 2011. It is a closed meeting where participants are selected for their commitment in HIV persistence research. For more information, see www.informedhorizons.com/persistence2011.

About Dr Savarino’s laboratory: Program for HIV Eradication, Dept of Infectious, Parasitic and Immune-mediated Diseases, Istituto Superiore di Sanita, Viale Regina Elena, 299 00161 Rome, Italy.

Animals were housed at Bioqual, Inc., Rockville, Maryland (www.bioqual.com), according to international ethical standards. – 12/9/11

Source

Are We STILL Blaming HIV on Men Living on the Down Low?
Posted by Janelle Harris
on December 11, 2011 at 10:39 PM
I never bought into the whole down low hype. It made for bestselling urban lit books and a hot talk show topic and it sure gave ladies pause to analyze everything about a guy, from the way he holds his napkin to the way he hails a cab.
But I always felt like it was a sensationalized trending topic, another manufactured epidemic, a way to make more headlines sing by capitalizing on the dysfunction of the black community. Like extra extra! Not only do they have the highest rates of heart disease and incarceration and violent deaths and broken homes and women who have an infinitesimal chance of getting married, but now their men are all on the undercover brother watch list, too.

I’m not saying there aren’t dudes living on the so-called down low. **Do men struggling with their sexual identity sometimes pretend to be something they’re not?** Sure. There are plenty of those — black, white, Indian, Cambodian, whatever.

But the proportions and rates got completely and totally out of proportion for us because, well, we like to have something to talk about at the hairdresser and barber shop. And with every man a moving target for suspicion, it’s been kind of absorbed into our culture as a way to call a dude’s masculinity into question.

**Tameka Raymond** unwittingly brought the issue to light again with her mini-rant on Twitter, suggesting that gay guys should be tagged like migrating geese so that we can distinguish them from the rest of the flock. **She isn’t the first woman to lament that men who may be gay — out or not — are getting harder and harder to spot.** But she is in the middle of a custody battle for her two sons with a superstar ex-husband who has had more than his fair share of rumors about his sexuality. Gossip blogs are flapping about the innuendo.

Rapper The Game also chimed in — because every so often, someone dusts him off and brings him out of obscurity to make a racy, head-scratching comment, and he rarely disappoints. This time, he said in an interview with VLADTV: “Game don’t have a problem with gay people,” he assured us. “Game has a problem with people that are pretending not to be gay but that are gay. Because the number one issue with that is that you could be fooling somebody and you could give them AIDS and they can die.”

First of all, who in the blazes, besides Elmo from Sesame Street and Dwayne “The Rock” Johnson, refers to himself in the third person in public? Not just once, but twice in one statement? It kind of threw me off to have someone look at the camera and say their own name as part of their thought process. Janelle is trying it out and she thinks it’s pretty lame.

Secondly, in the midst of his fault-finding with the down-low lifestyle, he **perpetuates a myth that HIV is percolating among gay folks** and that men who are engaging in homosexual behaviors are bringing it over the fence. Not so. Weigh the number of times a man pretending to be straight has, wittingly or not, infected his unsuspecting wife or girlfriend with HIV against the number of times a straight man has been out in the world slanging his man parts without a condom on and spreading the disease all around, received by a woman who didn’t have the good sense to insist he strap up (or strap up herself).

Or the gal who, still making in-the-heat-of-the-moment sexual decisions based on a crazy belief that she can tell just by looking at a guy or getting all lovey dovey and forgetting to love herself enough to protect her body. They’re the far more likely culprits.

The down low phenomena has skewed folks’ perception of what’s feeding this HIV/AIDS beast. It’s allowed people to skirt responsibility for what is glaringly true: ain’t no way, no how the small population of men who are living an undercover homosexual lifestyle could be responsible for the out-of-control rate of HIV infection in our community. Nope. There are still folks running around here — on college campuses, at the new club downtown, even now, bless the Lord, in retirement communities, where the HIV rate has skyrocketed — who are thinking with their crotches, not their common sense.

We can lull ourselves into a false sense of comfort that down low brothers are the root of our HIV epidemic or even list them as a real problem in our relationships. But it’s an old myth in a tired storyline.

**HIV Drives Families into ‘Irreversible Poverty’: UN**

Agence France Presse, (12.01.2011)–

HIV is pushing tens of thousands of affected families in Asia into “irreversible poverty,” with women and children hit hardest, according to experts with the UN Development Program. The catastrophic health care costs and loss of employment opportunities due to discrimination ensnare many such households in “rapid socioeconomic decline,” UNDP recently reported.

Governments in the region should do more to mitigate these problems, said Nicolas Rosellini, UNDP’s deputy regional director. “Without intervention, many [HIV-affected families] will slip into irreversible poverty,” he said.
Compared to the household average, HIV-burdened families in the region spend up to three times more on health care, said the report. Because it provides widespread antiretroviral therapy, Cambodia is the region’s only country where this cost disparity is not as substantial, the report said. The study examined data from 17,000 households across Asia.

HIV-affected households also have more difficulty paying school fees, so the dropout rate for their children is far higher than average, the report noted. HIV-related household economic consequences drive many families into debt traps, locking their children into a lifetime of poverty.

For more information, visit: http://www.beta.undp.org/content/undp/en/home/librarypage/hiv-aids/the_socio-economicimpactofhivatthehouseholdlevelinasiaaregionala.html.

**'Pep talk' can revive immune cells exhausted by chronic viral infection**

Chronic infections by viruses such as HIV or hepatitis C eventually take hold because they wear the immune system out, a phenomenon immunologists describe as exhaustion.

Yet exhausted immune cells can be revived after the introduction of fresh cells that act like coaches giving a pep talk, researchers at Emory Vaccine Center have found. Their findings provide support for an emerging strategy for treating chronic infections: infusing immune cells back into patients after a period of conditioning.

The results are published this week in Proceedings of the National Academy of Sciences Early Edition. The first author of the paper is Rachael Aubert, a student in Emory’s Immunology and Molecular Pathogenesis program who completed her doctorate in 2009. Senior author Rafi Ahmed, PhD, is director of the Emory Vaccine Center and a Georgia Research Alliance Eminent Scholar.

Ahmed’s laboratory has extensive experience studying mice infected with lymphocytic choriomeningitis virus (LCMV). Immune responses against LCMV are driven by CD8 or "killer" T cells, which destroy virus-infected cells in the body. But a few weeks after exposure to LCMV, the mice develop a chronic infection that their immune systems cannot shake off, similar to when humans are infected by viruses like HIV and hepatitis C.

Aubert and her co-workers examined what happened to mice chronically infected with LCMV when they infused CD4 or "helper" T cells from uninfected mice. After the infusion, the CD8 cells in the infected mice revived and the levels of virus in their bodies decreased by a factor of four after a month. Like coaches encouraging a tired athlete, the helper cells drove the killer cells that were already in the infected mice to emerge from exhaustion and re-engage.

The cell-based treatment was especially effective when combined with an antibody that blocks the molecule PD-1, which appears on exhausted T cells and inhibits their functioning. The antibody against PD-1 helps the exhausted T cells to revive, and enhances the function of the helper cells as well: the combination reduced viral levels by roughly ten-fold, and made the virus undetectable in some mice.

"We have not seen this sharp of a reduction in viral levels in this system before," says co-author Alice Kamphorst, a postdoctoral fellow.

The helper cells were all genetically engineered to recognize LCMV, a difference between mouse experiments and potential clinical application. However, it may be possible to remove helper T cells from a human patient and stimulate them so that all the cells that recognize a given virus grow, Kamphorst says.

"This is an active area of research and several laboratories are looking at how best to stimulate T cells and re-introduce them," she says.

In addition, she and her co-workers are examining what types of hormones or signaling molecules the helper cells provide the killer cells. That way, that molecule could be provided directly, instead of cell therapy, she says.

The molecule PD-1 was previously identified by Ahmed and colleagues as a target for therapy designed to re-activate exhausted immune cells. Antibodies against PD-1 have been undergoing tests in clinical studies against hepatitis C and several forms of cancer.


**Co-infection with hepatitis B worsens HIV-related outcomes**

Michael Carter
Published: 13 December 2011

Co-infection with hepatitis B virus increases the risk of AIDS or death for patients newly diagnosed with HIV, investigators from the US military report in the online edition of the *Journal of Infectious Diseases*. 
Individuals with chronic hepatitis B infection were twice as likely to progress to AIDS/death compared to patients who were only infected with HIV.

“With compelling data confirming the risk for persons with co-infection, it is imperative that we commit to implement...additional steps to combat hepatitis B now,” write the authors of an accompanying editorial.

HIV and hepatitis B share modes of transmission. These include sexual exposure, injecting drug use and mother-to-child transmission. Therefore a significant proportion of HIV-positive patients are co-infected with HIV.

Infection with HIV can accelerate the course of hepatitis B disease.

“HIV co-infection is known to influence the natural history and course of hepatitis B by impairing the quantity and quality of the innate and adaptive immune response,” explain the authors.

There is no cure for hepatitis B, but a number of antiretroviral drugs are active against both HIV and hepatitis B and can thus help prevent liver damage and disease progression.

Studies exploring the impact of hepatitis B on HIV-related outcomes have yielded conflicting results. However, these studies were limited by their inability to control for a number of factors, including duration of infection with HIV.

In order to overcome this limitation, investigators from the US military designed a retrospective study, involving patients with an approximate date of HIV-seroconversion who were categorised according to their hepatitis B infection status. A series of analysis were then conducted to assess the impact of co-infection on the risk of progression to AIDS and death.

Patients diagnosed with HIV since 1986 were included in the study. All had been repeatedly screened for the infection and it was possible to estimate the date of their seroconversion within three years.

Their routine care involved testing for hepatitis B. This screening showed that 74% had never been infected with the virus; 20% had resolved hepatitis B infection; 4% had isolated hepatitis B core antigen (HBcAb); and 3% had chronic hepatitis B infection.

Importantly, 48% of patients were diagnosed with HIV before the advent of effective HIV therapy in 1996.

The investigators had 16,946 person years of follow-up available for analysis. During this time, 305 patients developed AIDS and 164 died.

Initial analysis showed that hepatitis B infection status was significantly associated with these outcomes.

Compared to individuals with no hepatitis B infection, patients with chronic hepatitis B were over twice as likely to develop AIDS or die (RR = 2.23; 95% CI, 1.51-3.28). The risk of these outcomes was also significantly increased for patients with isolated HBcAb (RR = 1.54; 95% CI, 1.02-2.34), and for those with resolved hepatitis B infection (RR = 1.35; 95% CI, 1.09-1.66).

Subsequent analysis that controlled for potential confounding factors, such as year or diagnosis and use of potent HIV therapy showed that showed that chronic hepatitis B infection remained associated with a significant risk of AIDS or death (HR = 1.80; 95% CI, 1.20-2.69). There was also a non-significant trend suggesting that resolved hepatitis B infection (HR = 1.17; 95% CI, 0.94-1.46) and isolated HBcAb (HR = 1.14; 95% CI, 0.75-1.75) were also associated with AIDS or death.

“We found that hepatitis B virus infection has a significant impact on HIV outcomes,” comment the investigators. “We also found an increased risk of AIDS or death in the HAART [highly active antiretroviral therapy] era, despite the fact that the majority of participants received an hepatitis B-active drug as part of their regimen.”

Only a fifth of patients had been vaccinated against hepatitis B, leading the investigators to suggest: “Our findings underscore the need to prevent hepatitis B in those with HIV and also in cohorts of HIV-negative individuals with risk factors for HIV acquisition.”

However, the study had a number of limitations. Most notably, it did not differentiate the causes of death, and many of the deaths in co-infected patients could have been due to factors other than hepatitis B.

Nevertheless, the authors of an accompanying editorial believe the research “adds to the weight of evidence that co-infection is deleterious by demonstrating that in a well-characterised cohort, it doubles the risk of AIDS-defining illness and death.”

They believe this underscores the importance of vaccinating individuals with or at risk of HIV against Hepatitis B and the inclusion of drugs that work against both infections in the antiretroviral therapy of co-infected patients.
Gladstone Scientists Identify Human Proteins that May Fuel HIV/AIDS Transmission
Breakthrough offers new hope in fight against global pandemic

SAN FRANCISCO, CA—December 14, 2011—Scientists at the Gladstone Institutes have discovered new protein fragments in semen that enhance the ability of HIV, the virus that causes AIDS, to infect new cells—a discovery that one day could help curb the global spread of this deadly pathogen.

HIV/AIDS has killed more than 25 million people around the world since first being identified some 30 years ago. In the United States alone, more than one million people live with HIV/AIDS at an annual cost of $34 billion.

Previously, scientists in Germany discovered that HIV transmission is linked to the presence of an amyloid fibril in semen. This fibril—a small, positively charged structure derived from a larger protein—promotes HIV infection by helping the virus find and attach to its target: CD4 T white blood cells. In tomorrow’s issue of Cell Host & Microbe, researchers in the laboratory of Warner C. Greene, MD, PhD, who directs virology and immunology research at Gladstone, describe a second type of fibril that also has this ability.

These findings may spur efforts to slow the spread of HIV/AIDS. Prevention has recently focused on microbicides; chemical gels that, when used by women during sexual intercourse, block HIV infection. But while early microbicides had some success—reducing infection by an average of 39%—more recent trials have failed and devising a truly potent microbicide remains a top priority.

“Today's microbicides may be failing because, while they do target the virus itself, they don’t block the virus from interacting with the natural infection-enhancing components of semen,” said Nadia R. Roan, PhD, the paper’s first author and a research scientist at Gladstone, an independent and nonprofit biomedical-research organization. “Now that we more fully understand how HIV hijacks these components to promote its own infection, we are one step closer to developing a microbicide that can more effectively stop HIV.”

Sexual transmission accounts for the vast majority of HIV infections, and semen is the virus' key mode of transport. Earlier studies by Drs. Roan and Greene revealed the mechanism by which a positively charged fibril in semen—called SEVI—attracts HIV like a magnet, binding to the negatively charged HIV and helping to infect CD4 T cells. Here, they set out to investigate whether other components of semen also played a part.

In laboratory experiments on human semen samples, they identified a second set of fibrils—derived from larger proteins called semenogelins—that enhance HIV infection just as SEVI does. Removing these and other positively charged components from semen diminished HIV’s ability to infect CD4 T white blood cells. Further confirming the role of these fibrils in promoting HIV infection, Drs. Roan and Greene found that semen samples from men who are naturally deficient in semenogelins—a disorder called ejaculatory-duct obstruction—also had a limited ability to enhance HIV infection.

“Our experiments suggest that fibrils derived from semenogelins—the major component of semen—are integral to enhancing HIV infection in semen,” said Dr. Roan. “But we are intrigued by their natural, biological function as well. The fact that these fibrils are found in male reproductive organs could point to an evolutionary role in fostering fertilization—something we’re currently exploring.”

“We hope that this research paves the way for the next-generation of microbicides that can both neutralize these fibrils and attack the virus,” said Dr. Greene, who is also a professor of medicine, microbiology and immunology at the University of California, San Francisco, with which Gladstone is affiliated. “This type of one-two punch in a microbicide—what current products lack—could finally give women real protection against HIV’s deadly attack.”

Reference
Researchers have created a new synthetic class of helix-shaped molecules which they believe could be a key tool in the worldwide battle against antibiotic resistance. By twisting molecules around iron atoms they have created what they term 'flexicates' which are active against MRSA and E-coli—but which also appear to have low toxicity, reducing the potential for side effects if used in treatment. The work is published in Nature Chemistry.

The new structures harness the phenomenon of 'chirality' or 'handedness' whereby the corkscrew molecules could be left-handed or right-handed. By making the most effective 'hand' to attack a specific disease, the University of Warwick research paves the way towards a more targeted approach to killing pathogens. In the case of E-coli and MRSA, it is the left 'hand' which is most effective.

Professor Peter Scott of the University of Warwick's chemistry department said although this particular study concentrated on flexicates' activity against MRSA and E-coli, the new method of assembly could also result in new treatments for other diseases.

"It's a whole new area of chemistry that really opens up the landscape to other practical uses. These new molecules are synthetically flexible, which means that with a bit of tweaking they can be put to use against a whole host of different diseases, not just bugs like MRSA which are rapidly developing resistance to traditional antibiotics. Flexicates are also easier to make and produce less waste than many current antibiotics."

Scientists have long been able to copy nature's corkscrew-shaped molecules in human-made structures known as helicates—but they have thus far not been able to use them in fighting diseases. One of the key issues is the problem of handedness. Sometimes 'left-handed' molecules in drugs are the most effective at combating some disease, while sometimes the 'right-handed' version works best. Until now, scientists working with helicates have found it difficult to make samples containing just one type of corkscrew; either the right- or left-handed twist.

With flexicates, the University of Warwick scientists have succeeded in making samples containing just one type of twist—resulting in a more targeted approach which would allow the drug dosage to be halved. Flexicates solve other problems encountered by helicates, as they are easier to optimise for specific purposes, are better absorbed by the body and are easier to mass-produce synthetically.

Professor Scott said: "Drugs often have this property of handedness—their molecules can exist in both right and left handed versions but the body prefers to use only one of them. For this reason, drug companies have to go to the trouble of making many traditional molecules as one hand only. What we have done is solve the 'handedness' problem for this new type of drug molecule. By getting the correct hand we can halve the drug dose, which has the benefits of minimising side effects and reducing waste. For patients, it's safer to swallow half the amount of a drug. Our work means that we can now make whichever hand of the corkscrew we want, depending on the job we require it to do."

**Journal Reference:**

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**How the Bioweapon Ricin Kills: Scientists Solve Mystery Through Revolutionary New Technology**

ScienceDaily (Dec. 1, 2011) — A key protein that controls how the deadly plant poison and bioweapon ricin kills, has finally been identified by researchers at the Institute of Molecular Biotechnology in Vienna, Austria. The discovery was made using a revolutionary technology that combines stem cell biology and modern screening methods, and reported on 2 December 2011 in the scientific journal *Cell Stem Cell.*

Shocking news spread in August this year. Al Quaida, a terror organization, was reported to be producing bombs containing the poison ricin to attack shopping centers, airports, or train stations. Since the First World War, ricin has had a gruesome reputation as a bioweapon. It is one of the deadliest plant based poisons in the world. Even a tiny amount can kill a person within two to three days after getting into the bloodstream. And it comes from the humble castor oil bean, available in many health food shops or online.

**How the poison works**

Castor oil is a powerful laxative, used medicinally for centuries, but the raw beans also contain small amounts of the poison ricin. **So far no antidote is available.** But now Ulrich Elling, a scientist on the research team led by Prof Josef Penninger at the Institute for Molecular Biotechnology (IMBA) of the Austrian Academy of Sciences in Vienna, has identified a protein molecule called Gpr107. This protein in
the targeted cells is essential for the deadly effect of ricin. In other words, cells which lack Gpr107 are immune to the poison.

Ulrich Elling is optimistic, saying "Our research suggests that a specific antidote could now be developed by making a small molecule to block the Gpr107 protein."

**New technology allows screening of the entire mammal genome**

The researchers at IMBA were able to find in just a few weeks what others have been trying to find for decades. Their rapid success was made possible by a pioneering new method of genetic research developed largely by Ulrich Elling and Josef Penninger. With this new method, an entire mammal genome can be screened for mutations within a reasonable time frame.

Until now, screening methods for mice, rats and other mammals have focused on finding one single mutation. This was done using a technique called RNA interference or by breeding a suitable 'knock-out mouse' to study the effect of removing a single gene. But RNA interference doesn't always work, and breeding a knock-out mouse takes years and considerable effort.

That's why Josef Penninger sees this powerful technology as a revolution in biomedicine. "We've now succeeded in combining the genetics of yeast, which has a single chromosome set that allows instant gene mutation, with stem cell biology," he says. "For decades researchers have been looking for a system in mammals which would allow scientists to reconstruct millions of gene mutations simultaneously. We have solved the puzzle and even broke a paradigm in biology—we managed to make stable mouse stem cells with a single set of chromosomes and developed novel tools to use such stem cells to rapidly check virtually all genes at the same time for a specific function."

This new technology helped Ulrich Elling in unraveling the toxic effect of ricin. He tested the poison in thousands of different mutations of mouse stem cells, and discovered that 49 different genetic mutations were present in one single protein, Gpr107. Obviously, a mutation in this protein saved the cells.

**Combination with stem cell research reveals broad range of applications**

The incredible potential in this discovery becomes even clearer in the light of stem cells' ability to transform into any cell in the human body. Josef Penninger is excited. "The possible uses of this discovery are endless. They range from fundamental issues, like which genes are necessary for the proper function of a heart muscle cell, to concrete applications as we have done in the case of ricin toxicity."

Penninger's team is already working on its next projects, including studies on how tumor cells acquire resistance to chemotherapy, a key issue in the development of cancer, and how nerve cells can regenerate, to offer hope in cases of paraplegia.

**Journal Reference:**


**Survey: One in Five US Women Victims of Sexual Assault**


A CDC official said Wednesday new research shows an “astounding” prevalence of intimate partner violence in the United States. “It’s the first time we’ve had this kind of estimate,” said Linda Degutis, director of the National Center for Injury Prevention and Control, who oversaw the *randomized telephone survey of roughly 9,000 women and 7,400 men.*

Of the women, one in four said they were violently attacked by either a husband or boyfriend. One in five women said they were the victims of rape or attempted rape; about one-half of those reports involved intimate partners.

As many as one in three women experienced *rape, stalking or physical violence*—including choking, beating, stabbing, shooting, punching, hair pulling or being pushed into something—by an intimate partner in their lifetime, compared to one in 10 men; these women and men reported more health problems.

When broken out by state, the data show higher reports of rapes or attempted rapes of *women in Alaska, Oregon, and Nevada; Virginia and Tennessee had some of the lowest.*

Linda James, health director for the San Francisco-based Futures Without Violence advocacy organization, said rape is “a major problem that often is underestimated and overlooked.”
The CDC survey did not verify the reports, which were made anonymously. Several figures are higher than those of other sources, but Bureau of Justice Statistics statistician Shannan Catalano said this may be due to how the surveys are done, who participates, and how “rape” and other types of assault are defined or interpreted. “It’s an evolving field, and everyone is striving to get a handle on what’s the best estimate,” she said.

The survey marks the beginning of a new annual CDC study on females who report abuse. For more information, visit http://www.cdc.gov/violenceprevention/nisvs/.

F. nucleatum enables breaking bond on blood vessels to allow invaders in

A common oral bacteria, Fusobacterium nucleatum, acts like a key to open a door in human blood vessels and leads the way for it and other bacteria like Escherichia coli to invade the body through the blood and make people sick, according to dental researchers at Case Western Reserve University.

Yiping Han, professor of periodontics at the Case Western Reserve School of Dental Medicine, made the discovery in her continued work with the Fusobacterium nucleatum bacterium, one of the most prevalent of the more than 700 bacteria in the mouth.

She found the gram-negative anaerobe has a novel adhesin or bonding agent she’s named FadA that triggers a cascade of signals that break the junctures in an interlocking sheath of endothelial cells on blood vessel’s surface just enough to allow F. nucleatum and other bacteria into the blood.

A description of bond-breaking process was described in the Molecular Microbiology article, “Fusobacterium nucleatum adhesin FadA binds vascular endothelial cadherin and alters endothelial integrity.”

The microbiologist at the dental school has studied the oral bacteria over the past decade and was the first to find direct evidence that linked it to preterm labor and fetal death. But its presence is found in other infections and abscesses in the brain, lungs, liver, spleen and joints.

After finding and genetically matching the oral bacteria in the fetal death, she began to unravel the mystery of how an oral bacterium can be found throughout the body and jumps the blood-brain and placental barriers that usually block disease-causing agents.

Through years of lab work, her research led to the vascular endothelial (VE)-cadherin, cell-cell junctures that link the endothelial vascular cells together on the blood vessels.

These junctures are like a hook and loop connection, but for some unknown reason when F. nucleatum invades the body through breaks in the mucous membranes of the mouth, due to injuries or periodontal disease, this particular bacterium triggers a cascade of signals that causes the hook to recede back into the endothelial cell. The oral bacterium leads the way with any other harmful invaders following along.

This “deceding” was observed by confocal microscopy when Han used cells from human umbilical cord. The researchers introduced F. nucleatum and demonstrated the VE-cadherins break on bonds on the endothelial cells and creating enough space in the endothelium for the invaders to move in.

Lab tests included introducing F. nucleatum with and without other bacteria. When E. coli alone was introduced, the bond did not break. But when F. nucleatum was introduced first, the bond broke, and the E. coli bacteria were able to move through the otherwise intact cell layers.

“This cascade knocks out the guard on duty and allows the bacteria to enter the blood and travel like a bus loaded with riders throughout the system. Whenever the F. nucleatum wants to get off the bus at the liver, brain, spleen, or another place, it does,” Han said.

When it disembarks from its ride through the blood, it begins to colonize. The colony of bacteria induces an inflammatory reaction that has a range of consequences from necrosis of tissue to fetal death.
Changing the Locks: HIV Discovery Could Allow Scientists to Block Virus’s Entry Into Cell Nucleus

ScienceDaily (Dec. 8, 2011) — Scientists have found the 'key' that HIV uses to enter our cells' nuclei, allowing it to disable the immune system and cause AIDS. The finding, recently published in the open access journal PLoS Pathogens, provides a potential new target for anti-AIDS drugs that could be more effective against drug-resistant strains of the virus.

HIV is transmitted through bodily fluids, primarily infected blood or semen. Once inside the bloodstream, the virus infects key components of the immune system, including cells known as macrophages. It works its way into the nucleus of the macrophages, where it integrates itself into the cell's DNA, allowing it to replicate and spread throughout the body.

To access the DNA, the HIV must pass through the nuclear pore complex, a gateway into the nucleus. Until now, the mechanism that allows the virus to pass through this gateway was unknown.

Now, a team of scientists from UCL (University College London), the University of Pennsylvania School of Medicine and the Laboratory of Molecular Biology in Cambridge has identified a vital component of this mechanism. A part of the virus called the capsid protein, acting like a key, binds to Nup358, a protein on the nuclear pore complex, unlocking the gateway and granting the virus access to the DNA.

Professor Greg Towers, a Wellcome Trust Senior Research Fellow at UCL, who led the research, says: "It's 30 years since the first cases of AIDS were reported, and while great progress has been made in developing and improving antiretroviral drugs for treating HIV infection, the virus often develops resistance against these drugs, making it very difficult to treat. It's very important that we stay one step ahead with new therapeutic strategies."

"In our research, we have found the 'lock and key' that allow HIV to enter a cell's nucleus. Once inside, the virus can begin to replicate itself, spreading almost unchecked throughout the body. If we were able to block this entry with a drug—in effect, to change the locks—then we could stop this spread."

Targeting proteins in the host, rather than in the virus itself, has added benefits, explains first author Dr Torsten Schaller. "Almost all HIV treatments target the virus itself," he says. "We know that HIV can easily evolve and change, which means that the virus can become immune to the effects of the drugs, rendering them ineffective. But if we can develop drugs which target proteins in the infected person's body, the virus will struggle to evolve to get around this."

According to the World Health Organization, 33.3 million people were living with HIV in 2009, of which 2.6 million were newly infected. Without treatment, the virus causes potentially fatal damage to the immune system, leading to opportunite infections. Deaths from AIDS-related illnesses are the third most common cause of death in low-income countries, killing around 1.8 million people a year worldwide.

Professor Danny Altmann, Head of Pathogens, Immunology and Population Health at the Wellcome Trust, said: "This is exciting work into somewhat uncharted territory. Professor Towers and colleagues have taken a big step towards modelling how HIV enters and integrates itself into the cell's DNA and then uses it to replicate. It offers the prospect of novel ways to try and combat HIV infection."

Journal Reference:
Dr. Robert Grant
By Alice Park Wednesday, Dec. 14, 2011

Dr. Robert Grant has been a quietly powerful force in HIV research for years. In the early 2000s it was Grant, a professor of medicine at University of California, San Francisco, and Gladstone Institute of Virology and Immunology, who pushed to test the potential of antiviral drugs — normally used to treat people who already have HIV — as a way to protect healthy, uninfected people from acquiring the virus. His first study of the medications in gay men wasn’t popular — why test the drugs in healthy people when millions of HIV-positive patients didn’t even have access to the medications? — but proved successful, lowering new infection rates among men taking the antivirals prophylactically.

But it wasn’t until 2011 that Grant’s true influence on the battle against AIDS finally emerged. His initial research set the stage for further studies of the treatment-as-prevention strategy in other populations. This year a groundbreaking study found that treating the uninfected partner in heterosexual couples — in which one person had HIV and the other did not — dramatically reduced the risk of transmission. Another study found that giving antiviral drugs to heterosexual men and women also cut their risk of infection. The findings are crucial, since it is the heterosexual population that currently bears the heaviest burden of new HIV infections around the world. With hopes for a vaccine continually receding and safe-sex campaigns of limited value, Grant’s idea (along with other emerging prevention strategies, like male circumcision) has the potential to halt the AIDS epidemic by stopping infections from occurring in the first place.

Press Release — 12/16/2011

Congress to Restore Federal Syringe Exchange Funding Ban as Part of 2012 Spending Package

Ban on Allowing States to Use HIV Prevention Money on Life-Saving Syringe Programs was Overturned in 2009 After 20-Year Struggle

Reinstatement of Ban will Lead to Thousands of New HIV/AIDS, Hepatitis C Cases Annually

As part of the 2012 spending package being voted on today, Congress is restoring a ban on using federal funding for syringe exchange programs that reduce the spread of HIV/AIDS, hepatitis C, and other infectious diseases. The ban, enacted in the 1980s and repealed in 2009, was largely responsible for hundreds of thousands of Americans contracting HIV/AIDS directly or indirectly from the sharing of used syringes. Advocates warn that restoring the ban will result in thousands of Americans contracting HIV/AIDS, hepatitis C or other infectious diseases next year alone.

"The federal syringe funding ban was costly in both human and fiscal terms – it is outrageous that Congress is restoring it given how overwhelming and clear the science is in support of making sterile syringes widely available," said Bill Piper, director of national affairs for the Drug Policy Alliance. "Make no mistake about it — members of Congress who supported this ban have put the lives of their constituents in jeopardy."

House Republicans passed restrictive language in three separate appropriations bills, and succeeded in getting two of three bans in the current House-Senate compromise omnibus for Fiscal Year 2012 being voted on today. In addition to the overarching ban on domestic use of federal funds contained in the Labor-HHS spending bill, House republicans also succeeded in imposing a ban on use of State Department funds for syringe access in international programs. In large parts of the world the HIV/AIDS epidemic is being driven by injection drug use. The international syringe funding ban will mean the global HIV/AIDS epidemic will continue to grow.

The existing federal syringe exchange policy, signed into law by President Obama in December of 2009, allows states and local public health officials to use federal funds for syringe access, in consultation and with the consent of local law enforcement. The policy change is widely credited with having prevented thousands of new cases of HIV and Hepatitis C, thereby saving many lives and improving public health and safety.

The Centers for Disease Control and Prevention (CDC), American Medical Association, National Academy of Sciences, American Public Health Association, and numerous other scientific bodies have found that syringe exchange programs are highly effective at preventing the spread of HIV/AIDS and other infectious diseases. Increasing the availability of sterile syringes through exchange programs, pharmacies and other outlets also helps injection drug users obtain drug education and treatment. Eight federal reports have found that increasing access to sterile syringes saves lives without increasing drug use.
"We may have lost this battle, but we have just begun to fight," said Piper. "The Republicans who insisted on restoring the ban, and the Democrats who didn’t fight hard enough to oppose it, will be responsible for thousands of Americans contracting HIV/AIDS or hepatitis C. We will make sure Americans know which members of Congress care about their health and well-being and which do not."

Testing nasal vaccine for HIV treatment
Thirty years after AIDS was first described, there is still no effective vaccine against the virus. Worldwide, roughly 33 million people are HIV-positive. Researchers are working to find out whether a HIV vaccine developed by a Norwegian biotech company can be administered nasally.

In autumn 2011 the Norwegian biotechnology company Bionor Pharma reported promising findings from one of its studies: HIV patients who received the firm’s vaccine Vacc-4x, were twice as likely to not need any medications for at least a year.

Administering HIV vaccines nasally would be simpler and probably cheaper. (Illustrative photo: Dag Kvale) “Vaccination by injection requires good needle technique and lots of practice; otherwise the vaccine never reaches the immune cells,” explains Dag Kvale.

Given nasally
In trials so far, the Vacc-4x vaccine has been administered by injection into the outermost skin layer. Now a slightly modified version of the vaccine will be tested in a research project conducted at Oslo University Hospital.

“Now we will test whether efficacy is just as good when the vaccine is given in nasal-drop form.”

“We have a very different type of immune response in our mucous membranes compared to the skin, so the results may be anything from no effect to somewhat different to better than those obtained by Bionor Pharma so far.”

Professor Kvale, who conducts research at Oslo University Hospital’s Department of Infectious Diseases, makes it clear that his team has several years to go before they can have any definite answer as to whether the nasal vaccine will work.

High potential impact for developing countries
If testing shows that a simple nasal immunisation is effective, it could have a worldwide impact on the treatment of HIV-positive patients. The nasal procedure is simple and low-cost, which are highly significant factors if vaccines are to be administered large-scale and in poor countries with underdeveloped health care systems.

The first clinical trial of a nasal vaccine will be carried out by the end of 2011. The vaccine substance Vacc-4x will be mixed with an adjuvant developed by the Swedish company Eurocine Vaccines. Adjuvants are immunological agents added to vaccines to stimulate the body’s immune response by triggering a mild inflammatory reaction.

In the trial, 18 patients will receive Vacc-4x in various doses mixed with the adjuvant, while a control group of six patients will receive only the adjuvant. The first objective is to find out whether the vaccine administered nasally has any effect on the immune system, and if so, which dosage is best.

To strengthen the immune system
The overall objective of the research being carried out by Bionor Pharma and Professor Kvale’s group is to develop a therapeutic vaccine that boosts the body’s immune response to the HIV virus, reducing the viral load (the amount of active HIV in an infected person’s blood).

“Only a small proportion of the world’s HIV-positive people have access to treatment,” points out Birger Sørensen, Bionor Pharma’s head of vaccine development. “Our hope is that a therapeutic vaccine will be an effective treatment for HIV patients here in the Western world and in the rest of the world as well.”

Bionor Pharma has collaborated with Professor Kvale’s research group on two previous studies of Vacc-4x, with funding under the GLOBVAC programme. Mr Sørensen believes the results so far make Vacc-4x a frontrunner among HIV vaccine candidates.
“If the coming studies are also successful,” says Mr Sørensen, “we hope the vaccine will be on the market within a few years.”

From HIV to immune-system collapse and AIDS
Professor Kvale’s research group is also investigating what causes HIV infection to develop over time into immune-system collapse and AIDS. Such knowledge could help increase vaccine efficacy.

Vaccine trials to date have merely managed to lower the amount of HIV virus but not provided full control over it. The degree of control and pace at which the virus leads to deteriorating health can vary widely from patient to patient.

Harmful intestinal leakage
Professor Kvale believes that disease mechanisms in the intestine are linked to disease progression. Researchers have observed that in HIV patients there – Dag Kvale is less control over what kinds of substances can leak out of the intestine into the blood, including substances from intestinal microbes.

Some of the substances from dead, decomposing microbes trigger powerful inflammatory processes which over time overload the immune system and probably accelerate the onset of AIDS.

In collaboration with the Biotechnology Centre of Oslo and Rikshospitalet University Hospital, Professor Kvale and his team have seen that common anti-inflammatory medicines called COX inhibitors can slow the inflammatory processes associated with HIV.

“COX inhibitors may be suitable for HIV patients with limited access to expensive HIV treatment, or who react poorly to such treatment,” says Professor Kvale. “They may also be a means of improving the efficacy of vaccines.”

A particularly challenging virus
Despite the promising results from recent research on therapeutic vaccines, development of a preventive vaccine is still far into the future. It has proven very difficult to figure out how to prevent the HIV virus from entering the body.

One explanation for this is that scientists had relatively little previous experience with retroviruses, particularly when it comes to developing vaccines against them.

Furthermore, the HIV virus has a unique ability to make itself virtually undetectable once inside a cell. The virus can also mutate quickly, making it difficult for the immune system to identify the new variants.

Ethically problematic
Testing new preventive vaccines is a costly and extensive endeavour – and ethically problematic, according to Professor Kvale. Standard procedure is testing on persons without HIV in parts of the world with extremely high rates of infection.

Thousands of people need to be vaccinated. To find out quickly whether the vaccine actually works, however, researchers have to track infection rates among the many subjects who receive a placebo, and compare these to the rates among subjects who receive the real vaccine.

Perhaps a more ethical alternative would be to test the preventive vaccine as a therapeutic vaccine first – since scientists believe that many of the characteristics that a therapeutic vaccine needs would also be valuable in a preventive vaccine.

“Testing the candidate preventive vaccines in a therapeutic role on HIV-positive subjects would indicate far more quickly whether a candidate is likely to succeed as a preventive vaccine – and would be far less problematic ethically,” concludes Professor Kvale.

HPV Test Beats Pap Smear in Cervical Cancer Screening

Los Angeles Times, (12.15.2011) – Eryn Brown
Results from a new study involving nearly 40,000 women found that human papillomavirus (HPV) DNA testing in addition to Pap smear prevented more cervical cancer cases than Pap smear alone.

The trial randomized women in the Netherlands, ages 29-56, into two groups at baseline: One received HPV and cytology co-testing, and the other group received cytology testing alone. Five years later, both groups received co-testing.

Women co-tested at baseline had fewer cases of cervical abnormalities and cancers than women who had only Pap smears. “Our results lend support to the use of HPV DNA testing for all women aged 29 years and older,” concluded study leader Dr. Chris J.L.M. Meijer, of Amsterdam-based VU University Medical Center, and colleagues.
The full study, “Human Papillomavirus Testing for the Detection of High-Grade Cervical Intraepithelial Neoplasia and Cancer: Final Results of the POBASCAM Randomized Controlled Trial,” was published online ahead of the regular issue of Lancet Oncology (2011;doi:10.1016/S1470-2045(11)70296-0).

**First aid after tick bites**

Research News Dec 01, 2011

**They come out in the spring, and each year they spread further – the ticks.** Thirty percent of them transmit borrelia pathogens, the causative agent of Lyme borreliosis that can damage joints and organs. The disease often goes undetected. In the future, a new type of gel is intended to prevent an infection — if applied after a tick bite.

For years, Mrs. S. suffered from joint pain and headaches. After an odyssey through doctors’ waiting rooms, one doctor diagnosed Lyme borreliosis — an infectious disease transmitted by ticks. With its bite, the parasite introduced bacteria that then spread throughout the entire body. Mrs. S. is not alone — very often, the disease is recognized too late or not at all, or is not properly treated. Doctors are provided with no clues if the characteristic redness around the bite area is missing. Left untreated, Lyme borreliosis can cause symptoms that resemble rheumatism, damage joints, muscles and nerves and affect the organs.

If found in time, it can be successfully treated. If patients exhibit the disease-specific rash known as erythema migrans, doctors will prescribe antibiotics for several weeks. However, if, as in the case of Mrs. S., the disease has progressed far and is chronic, it is very difficult to treat. Currently, there is no prophylactic treatment and no vaccine against the infection. In the future, a new type of gel is supposed to nip the infection in the bud: the patient applies it locally immediately after the tick’s bite. Researchers of the Fraunhofer Institute for Cell Therapy and Immunology IZI in Leipzig developed the medication in close cooperation with the Swiss company Ixodes AG and the Institute for Infectious Diseases and Zoonoses of the Ludwig-Maximilian University in Munich (Institut für Infektionsmedizin und Zoonosen der LMU München). Ixodes AG is responsible for developing the formula, while IZI and LMU are carrying out the pre-clinical studies and the serological examinations.

If the gel is applied immediately to the bite after the tick has been removed and one does not wait for any potential symptoms to show, Lyme borreliosis could be prevented. This is because during the first few days, the bacteria stay right around the spot where the tick bite occurred and spread out only after that. The active ingredient of the gel is azithromycin, which is highly effective against borrelia bacteria and kills them locally in the skin,“ says Dr. Jens Knauer, project manager at IZI. Unlike other antibiotics, there is no known resistance of borrelia strains against azithromycin. Another advantage of the active ingredient: it has few side effects and as a result does not stress the body. It also distinguishes itself by its good depot action of up to five days in the tissue. The treatment is successful only if the medication is applied within the first few days after the tick’s bite. “This gel, however, cannot be used to treat an established infection; it is suitable only for prophylaxis,” emphasizes Dr. Knauer.

The pre-clinical studies have already been completed successfully; in mice, the gel was effective even five days after a tick’s bite. The application has been patented. Starting this past summer, in a clinical phase III study (www.zeckenstudie.com), the researchers are testing the medication on persons with proven tick bites. „Should the results of the pre-clinical studies be confirmed on humans, the gel will help to significantly lower the number of new infections,“ the expert adds. Annually, up to 60,000 are stricken with Lyme borreliosis in Germany alone, according to estimates by the Robert Koch Institute, with an upward trend – since, due to climate change, ticks are expanding their range ever further. “As soon as the gel can be purchased at the pharmacy, persons who are particularly endangered, such as forest rangers, hunters, joggers or soccer players, should always carry it with them,” Knauer recommends.
Elizabeth Barrett Browning’s illness deciphered after 150 years

Known for her poetry, letters, love affair and marriage to Robert Browning, Elizabeth Barrett Browning also left a legacy of unanswered questions about her lifelong chronic illness. Now, a Penn State anthropologist, with the aid of her daughter, may have unraveled the mystery.

Born in 1806, Barrett Browning suffered throughout her life from incapacitating weakness, heart palpitations, intense response to heat and cold, intense response to illnesses as mild as a cold, and general exhaustion in bouts that lasted from days to months or years. Her doctors were unable to diagnose or treat her illness, which apparently first appeared around age 13.

"Conjectures by modern biographers about Barrett Browning’s condition include anorexia nervosa, neurasthenia; tuberculosis; pertussis, an encephalomyelitis; non-paralytic poliomyelitis; paralytic scoliosis, or the lifetime effects of injuries to her spine from falling from her horse in early adolescence; opium addiction; and mental illness, including anxiety and agoraphobia," Anne Buchanan, research associate in anthropology, reports in the current issue of Perspectives in Biology and Medicine.

Some even attribute her illness to defense against the inferior status and treatment of Victorian women, or simply to malingering.

Ellen Buchanan Weiss, Buchanan's daughter, noted the symptoms recorded in Barrett Browning's letters because the symptoms seemed so similar to those that she experienced. Buchanan Weiss has hypokalemic periodic paralysis (HKPP), a muscle disorder that causes blood levels of potassium to fall because potassium becomes trapped in muscle cells. The disorder was first described in 1874 in German and then in 1901 in English. Barrett Browning died in 1861, long before physicians would have any idea of HKPP.

Today, oral or intravenous potassium can prevent or stop an attack, but there is no cure for the disorder, which may be genetic, either inherited or caused by a sporadic mutation. According to Buchanan, there is slight evidence of an uncle in Barrett Browning's family who may have suffered the same symptoms. While Elizabeth and Robert did have a son, he apparently had no offspring so there are no living descendants.

A variety of triggers can initiate weakness for people with a periodic paralysis, says Buchanan. Common triggers for people with HKPP include anything that increases secretion of insulin — alcohol, hunger or high carbohydrate foods — table salt, excessive heat or cold, sudden temperature change, illness, sleep, exercise or some medications. Symptoms of HKPP generally first appear at puberty.

Barrett Browning's first bout occurred after a minor illness, which was followed by measles. Her health continued to decline, and although physicians were unable to diagnose her malady, one prescribed opium to which she became addicted for life. This illness lasted for more than a year and at times she was so weak she could not sit upright without support.

Barrett Browning writes in the diary that she kept during her 25th year of other triggers for her ailment. She notes becoming weak after eating a generous portion of honey, a substance that would increase insulin production. She reports an episode that followed an outing where she ran down a hill, was rained upon and thoroughly soaked.

Throughout her life, she suffered terribly during the cold damp winters in England, especially in London, and only found some relief after marrying Robert Browning and escaping to the warmer, milder climate of Italy.

Other incidents in her life that she recorded include suffering terribly after a day of religious fasting. Hunger is a strong HKPP trigger. Her letters to Browning, her 25th year diary and other letters to friends and relatives describe not only the symptoms of her disease, which mirror those of HKPP suffers and Buchanan Weiss specifically, but also a list of triggers that are now known to be specific triggers for HKPP.

After two years of declining health, Barrett Browning died on June 29, 1861, in Browning’s arms. Buchanan notes that "many others have read these same descriptions, looking for clues to her illness, but my daughter's experience with HKPP has given us a perhaps unique lens through which to view them.”
Alcohol increases desire for sex without condoms: systematic review
Michael Carter
Published: 21 December 2011
Alcohol consumption has an impact on the intention of individuals to have unprotected sex, according to the results of a systematic review and meta-analysis published in the journal Addiction.

“The higher the blood alcohol content, the more pronounced the intention to engage in unsafe sex,” comment the investigators.

Alcohol can lead to disinhibition, affect cognitive capacity, and has an impact on immune function. But a direct relationship between alcohol and the transmission of HIV and other infections is difficult to prove conclusively. This may be because people who consume alcohol may be more likely to have unprotected sex because they generally lead riskier lives.

One way of overcoming this limitation is to examine the relationship between blood alcohol levels and self-reported intention to use a condom or engage in unprotected sex.

Investigators from Canada therefore performed a systematic review and meta-analysis, identifying randomised studies that explored the relationship between alcohol consumption and sexual behaviour.

To be included in the analysis the studies had to satisfy five criteria:
- Original research published in a peer-reviewed journal.
- Individuals were randomised to receive differing doses of alcohol.
- The intention to engage in unprotected sex was analysed.
- The association between blood alcohol level and intention to engage in risky sex was tested.
- Individuals were assessed individually.

The twelve studies that met the inclusion criteria were conducted in the US between 2004 and 2010. All included young adults (mean age 23 to 27 years) recruited in college or community settings.

There was a consistent relationship between blood alcohol content and intention to engage in unprotected sex.

An increase in blood alcohol content of 0.1mg/ml (compared to a content of 0.0mg/ml) was associated with a 5% increase (95% CI, 2.8-7.1%) in the likelihood of having unsafe sex.

The investigators adjusted their results to take account of publication bias and other potentially confounding factors.

A clear relationship between alcohol consumption and intention to engage in unprotected sex remained apparent, with each 0.1 mg/ml increase in blood alcohol consumption increasing the likelihood of reporting an intention to have unprotected sex by 3% (95% CI, 2.0-3.9%).

“In experimental studies there is a consistent significant effect of the level of alcohol consumption on intention to use condoms, indicating that the higher the blood alcohol content, the higher the intention to engage in unsafe sex,” comment the authors.

However, they acknowledge that their study has a number of limitations: “Most importantly, this investigation does not focus on actual condom use, but instead examines the intentions to use condoms.”

Nevertheless, the investigators believe that their study is an important addition to the literature on alcohol use and the transmission of HIV and other sexually transmitted infections.

“We found evidence of potential pathways explaining this association,” write the researchers. “Alcohol impacted on intentions about unsafe sex with a clear dose-response relationship. This may, in part, be explained by its effect on cognitive functioning.”

The authors also believe their findings have public health implications and suggest “studies varying alcohol consumption experimentally using proven effective interventions in at risk groups with later measurement of incidence of HIV and sexually transmitted infections would be advisable.”

Reference

Human Clinical Trials of HIV Vaccine to Start in January
Canadian researchers announced on Dec. 20 that a Phase I trial of a vaccine to prevent HIV infection is set to launch in January. The experimental vaccine has been manufactured in the United States, and the research team—led by Dr. Chil-Yong Kang, a virologist at the University of Western Ontario—recently received US Food and Drug Administration approval to begin human trials.
The vaccine is unique in that it uses dead HIV-1 virus, an approach similar to that used for polio and influenza vaccines. The virus is genetically engineered not to cause HIV. Preliminary toxicology tests on animals did not show any adverse effects or safety concerns with the vaccine, called SAV001, and it can be produced in large quantities, Kang said.

“So we infect the cells with a virus and then the infected cells will produce lots of virus and we can collect them, purify them and then inactive them,” Kang said.

The Phase I safety trial will involve 40 HIV-positive individuals; it should take six months to complete and a year to evaluate results, Kang said. If the vaccine candidate proves safe, Phase II would be conducted with about 600 HIV-negative high-risk individuals to measure immune system responses. If it advances further, a Phase III trial involving about 6,000 HIV-negative high-risk people would test the vaccine’s efficacy using a vaccinated group and a non-vaccinated control group. Dosing schedules would be another variable to evaluate. It could take about five years for the vaccine to reach the market, Kang said.

**MDs Oppose Jail for Unsafe Sex by HIV Carriers**

*Ottawa Citizen*, (12.20.2011) — Sharon Kirkey

Canadians living with HIV should no longer face a possible prison sentence for failing to disclose their infection to sexual partners, British Columbia health experts said in a new editorial. People with HIV, unlike people with other STDs, are being singled out because of stigma and fear, said Dr. Julio Montaner, director of the British Columbia Center for Excellence in HIV/AIDS.

A study published this year found that early antiretroviral therapy for HIV patients reduced the likelihood of sexual transmission by 96 percent.

Nonetheless, Canada “now ranks among the world leaders” in the rate of prosecutions of people for allegedly exposing sexual partners to HIV, Montaner and colleagues M-J Milloy and Thomas Kerr wrote in the Canadian Medical Association Journal.

“Do we place a burden on males infected with [human papillomavirus] to have to disclose every time that they have a sexual encounter that they have HPV?” asked Montaner in an interview. “We don’t, and that’s only one example.”

“To put the burden on the person infected with HIV that they have to disclose when they may be on treatment or using a condom, or doing both, is really not appropriate,” Montaner said. “We can’t have a discourse that, on the one hand, says things are different now—we can identify HIV, we can treat it, you can have a near normal life—and, on the other hand, says if you [do not disclose] to another person we are ready to put you in jail,” said Montaner.

“Let me be clear—I think that people who behave irresponsibly, they need to be judged accordingly and there are laws to address those issues. If you mislead somebody, if you misrepresent your status—but to have a policy that selectively targets HIV” is discriminatory and discourages testing and treatment, Montaner said.


**One in Four Young Women Report Having Underage Sex**


Results from the Health Survey for England indicate a greater proportion of young women report having been sexually active before age 16 than in any previous generation.

Among respondents ages 16-24, approximately 27 percent of females said they had had sex before reaching 16, while 22 percent of males said they were under 16 at first sex. For both males and female, the median age of sexual debut was 17. Twenty-six percent of females and 32 percent of males said they had not yet had sex.

One in five sexually active 16- to 24-year-olds, 27 percent of males and 13 percent of females, reported having had 10 or more sex partners. Seventeen percent of females and 24 percent of males reported only having had one partner.

“Society has changed dramatically in the last 50 years, and the nature of relationships has too,” said Rebecca Findlay, spokesperson for the sexual health charity FPA. “Education and information safeguard the sexual health needs of young people and help them resist having sex before they’re ready, which is why, given this data, there’s an overwhelming need for statutory sex and relationship education in schools.”
While the results tend to mirror those of other research on the issue, “we must remember that most young people under 16 aren’t sexually active,” said Findlay.

**Legalized Same-Sex Marriage May Boost Gay Men’s Health**

*USA Today*, (12.17.2011) – Gay men who live in states where same-sex marriage is legal are healthier, less stressed, and make fewer doctor visits for general medical care, hypertension, and STDs, according to a new study. Researchers tracked data from 1,211 sexual minority men at a large community-based health center serving many LGBT patients in Massachusetts, which legalized same-sex marriage in 2003.

During the 12 months following legalization of same-sex marriage, there was a statistically significant decrease in medical care visits, mental health visits, and mental health care costs among gay and bisexual men, compared to the 12 months before legalization. Health care visits dropped 13 percent and health care costs 14 percent.

The benefits were similar for single gay men and those with partners. HIV-related health visits did not drop among HIV-positive men, suggesting those in need of care continued to use health care services.

“These findings suggest that marriage equality may produce broad public health benefits by reducing the occurrence of stress-related health conditions in gay and bisexual men,” lead author Mark Hatzenbuehler, a Robert Wood Johnson Foundation Health and Society Scholar at Columbia University’s Mailman School of Public Health, said in a foundation news release.

There were too few lesbians in the study to include for the analysis, but previous research suggests that not having the legal right to marry can have a stressful effect on lesbians, gays, and bisexuals, said the foundation release.

“This research makes important contributions to a growing body of evidence on the social, economic, and health benefits of marriage equality,” Hatzenbuehler said.


**Truvada Drug Levels in Vaginal and Rectal Tissue Offer Clues to HIV PrEP Puzzle**

Written by Liz Highleyman
The 2 drugs in the Truvada pill—tenofovir and emtricitabine—reach different concentrations in human cervical, vaginal, and rectal mucosa tissues and fluids, according to new research published in the *December 7, 2011, issue of Science Translational Medicine*. Lower drug levels in the female genital tract suggest that women may need higher doses to achieve a prophylactic effect, which may help explain conflicting results from some recent biomedical HIV prevention trials.

A series of large trials over the past 2 years have produced mixed findings about the benefits and risks of pre-exposure prophylaxis (PrEP), or use of antiretroviral drugs by HIV negative people in an effort to prevent infection.

The *iPrEx study* of gay and bisexual men in several countries and the *TDF2 trial* of heterosexual women and men in Botswana both showed that daily oral tenofovir/emtricitabine dramatically reduced the risk of HIV infection when given along with risk-reduction counseling, free condoms, and other prevention services.

The *Partners PrEP* trial of serodiscordant heterosexual couples found that both daily tenofovir/emtricitabine and oral tenofovir alone reduced the risk of infection, by 73% and 62%, respectively.

In contrast, the *FEM-PrEP trial* did not find a prevention benefit of daily oral tenofovir/emtricitabine for heterosexual women in Kenya, South Africa, and Tanzania; that trial was halted this past April after an interim review showed a similar number of new HIV infections in the tenofovir/emtricitabine and placebo arms.

Most recently, the *VOICE trial*, looking at women in South Africa, Uganda, and Zimbabwe, halted its oral tenofovir monotherapy arm in September after an interim analysis found that the study could not demonstrate that it was more effective than placebo. But another study arm testing tenofovir/emtricitabine was allowed to continue, suggesting the combination performed better in the interim analysis.

The reasons for these conflicting results are not clear, but researchers have noted that, overall, tenofovir-based PrEP appears to work somewhat better for men than for women, leading some to speculate that the drugs may not behave the same at different anatomical sites.
Kristine Patterson and Myron Cohen from the University of North Carolina Chapel Hill and colleagues designed a study to look at pharmacological properties of tenofovir and emtricitabine in genital and colon-rectal mucosal tissue from 15 healthy HIV negative volunteers, 8 men and 7 women.

Cohen was the principle investigator of the HPTN 052 study—presented to much fanfare at the International AIDS Society conference this summer in Rome—which showed that if the HIV positive partner in a serodiscordant couple started immediate ART upon diagnosis regardless of CD4 cell count, the risk of HIV transmission was reduced by 96%; HPTN was mostly conducted in low- and middle-income countries, however, and use of tenofovir/emtricitabine was uncommon (10% overall, but zero at several sites).

Participants in the current study received a single oral dose of Truvada. Starting 24 hours later and over the next 14 days, the researchers measured tenofovir and emtricitabine (aka FTC) levels in blood plasma and genital secretions using a sensitive assay with a lower limit of 0.1 ng/mL. Active metabolites of these drugs—tenofovir diphosphate and FTC triphosphate, respectively—were also measured in rectal, vaginal, and cervical tissue samples in the laboratory.

The authors explained that previous studies have carefully examined pharmacokinetic profiles of tenofovir and emtricitabine and their active metabolites during the first 24 hours after dosing, so they looked at longer-term changes.

**Results**

- Tenofovir and emtricitabine both were detected in blood plasma 14 days after administration of a single dose.
- The area under the concentration-time curve from 24 hours to 14 days (AUC$_{24-14d}$)—a measure of total exposure over time—for emtricitabine in genital secretions was 27-fold greater than blood plasma AUC.
- In contrast, the AUC$_{24-14d}$ for tenofovir was only 2.5-fold greater in genital secretions than in blood plasma.
- Rectal tissue concentrations of tenofovir/tenofovir diphosphate were 100-fold higher than concentrations in vaginal and cervical tissue.
- Conversely, vaginal and cervical tissue concentrations of emtricitabine were 10-fold to 15-fold higher than rectal tissue levels.
- In rectal tissue, tenofovir and tenofovir diphosphate were detectable for 14 days after dosing.
- Even though emtricitabine reached high concentrations in vaginal and cervical tissue, FTC triphosphate was only detectable for 2 days in all tissue types.

Based on these findings, the study authors summarized, exposure to tenofovir, tenofovir diphosphate, emtricitabine, and FTC triphosphate was "wide ranging depending on the type of mucosal tissue."

These results, they continued, "demonstrate the need for detailed pharmacological studies to improve the application of ART for PrEP to prevent transmission of HIV."

"The [tenofovir] concentration in rectal mucosa was greater and existed longer than the [emtricitabine] concentration, whereas the [emtricitabine] concentration in vaginal and cervical tissue was greater than the [tenofovir] concentration," they elaborated in their discussion. "This differential penetration may provide insight into the variable level of protection reported with different PrEP drug combinations in diverse populations in the different trials."

They pointed out that the protection against vaginal viral exposure demonstrated in mice and monkeys that were given tenofovir without or without emtricitabine, compared with the failure of daily oral ART to prevent HIV acquisition in FEM-PrEP and VOICE, "raises the possibility that the concentrations of [tenofovir] and [emtricitabine] in animal studies may be different from those achieved in humans, and that the concentrations achieved in humans are not sufficient to prevent HIV acquisition."

The researchers added that tenofovir diphosphate concentrations in vaginal tissue achieved using the 1% tenofovir microbicide gel tested in the successful CAPRISA 004 trial were 100 times greater than those observed in the current study after oral dosing, but were similar to the levels achieved in rectal tissue with oral use.

As an added piece of evidence, they noted, studies have shown that more than half of HIV positive women on ART with undetectable plasma viral load have detectable HIV in their genital secretions—higher than the number of men on suppressive ART who have detectable HIV in their semen. "Vaginal acquisition of HIV may require a stronger barrier to infection than that provided by oral dosing with a [tenofovir/emtricitabine] combination," the investigators concluded. "The results of the
current study and recent PrEP clinical trials indicate that more work needs to be done to elucidate the appropriate pharmacological barrier required to prevent HIV acquisition."—12/9/11

Reference

U.S. Science Advisory Board Asks Science, Nature To Omit Data From Bird Flu Studies Amid Security Concerns
The U.S. National Science Advisory Board for Biosecurity on "Tuesday asked two scientific journals to leave out data from research studies on a lab-made version of bird flu that could spread more easily to humans, fearing it could be used as a potential weapon," Reuters reports (Steenhuysen, 12/20). The board "recommended that the journals Science and Nature publish only the general discoveries, not the full blueprint for these man-made strains," the Associated Press notes (Neergaard, 12/20). "Editors at the journals ... say they will not agree to the redactions until they are assured the data will be accessible to researchers" according to BBC News (12/20).

"The labs found that it appears easier than scientists had thought for the so-called H5N1 bird flu to evolve in a way that lets it spread easily between at least some mammals," the AP writes (12/20). "The articles involved work done by Yoshihiro Kawaoka, a University of Wisconsin-Madison scientist, and Dr. Ron Fouchier and colleagues from the Erasmus Medical Center in Rotterdam," Reuters reports (12/20). Their research "show[s] how a bird flu variant can pass easily between ferrets," BBC notes. "At least one set of scientists have already rewritten their paper in light of the recommendation, Science reports," and the other is "reluctantly submitting a revised paper to Nature, a university spokesman confirmed to Science," BBC writes (12/20).

Haiti Experiencing Decline In Cholera Cases As Dry Season Begins
"Haiti has seen a steady decline in the number of cholera cases, as the Caribbean nation settles into its dry season, humanitarian groups said Tuesday," the Associated Press reports, adding, "The seasonal decline in the number of cholera cases is consistent with the findings of a report released Tuesday by the United Nations Office for the Coordination of Humanitarian Affairs." According to the report, health officials are recording about 300 cases nationwide per day, compared with 500 cases one month ago, and the mortality rate has dropped or leveled in nearly all of Haiti's 10 departments, the AP notes (Daniel, 12/20).

U.N. 'Must Face Up' To Haiti Cholera Outbreak
In this Guardian opinion piece, Mark Weisbrot, co-director of the Center for Economic and Policy Research in Washington, D.C., writes that the U.N. "must face up" to a cholera outbreak allegedly brought to Haiti by peacekeeping troops in the aftermath of the January 2010 earthquake. "More than 500,000 have been infected, and the disease—which Haiti has not had in more than a century—is now endemic to the country and will be killing people there for many years to come," he writes.

"Last week, U.N. officials once again denied responsibility for the disaster, and were, in my view, publicly dishonest about the available scientific research—some of which was included in the U.N.'s own report on the epidemic," he continues. He cites evidence from multiple reports and media coverage from the time of the outbreak and concludes, "Everyone who cares about human rights in this hemisphere should join this effort to hold the U.N. accountable for this disaster" (12/20).

Study details how dengue infection hits harder the second time around
One of the most vexing challenges in the battle against dengue virus, a mosquito-borne virus responsible for 50-100 million infections every year, is that getting infected once can put people at greater risk for a more severe infection down the road.

Now, for the first time, an international team of researchers that includes experts from the University of California, Berkeley, has pulled apart the mechanism behind changing dengue virus genetics and dynamics of host immunity, and they are reporting their findings in the Dec. 21 issue of Science Translational Medicine. The virus that causes dengue disease is divided into four closely related serotypes (dengue virus 1, 2, 3 and 4), and those serotypes can be further divided into genetic variants, or subtypes. The researchers showed that a person's prior immune response to one serotype of dengue virus could influence the interaction with virus subtypes in a subsequent infection. How that interaction plays out
could mean the difference between getting a mild fever and going into a fatal circulatory failure from dengue hemorrhagic fever or dengue shock syndrome.

The findings have implications for the efforts to combat a disease that has grown dramatically in recent decades, including the development of a first-ever dengue vaccine.

According to the World Health Organization, dengue disease is now endemic in more than 100 countries around the world, and recent estimates say some 3 billion people – almost half of the world’s population – are at risk.

It was already known that upon a person’s first infection with dengue virus, the immune system reacts normally by creating antibodies to fight the viral invaders. The problem is that those antibodies can then be confused if confronted later with one of the other three types of dengue virus, and as this new study revealed, even different subtypes within the same serotype.

"With the second infection, the antibodies sort of recognize the new type of viruses, but not well enough to clear them from the system," said study lead author Molly OhAinle, post-doctoral fellow in infectious diseases at UC Berkeley’s School of Public Health. "Instead of neutralizing the viruses, the antibodies bind to them in a way that actually helps them invade the immune system’s other cells and spread."

The study authors noted that this Trojan horse effect has been shown before, but the new research provides an analysis of the interplay between viral genetics and immune response with unprecedented detail, going beyond the main serotype.

Putting the puzzle pieces together required UC Berkeley’s expertise in immunology and virology, the genome analysis and biostatistical capabilities at the Broad Institute of Harvard University and Massachusetts Institute of Technology, and the epidemiological and clinical field work at Nicaragua’s National Viology Laboratory.

Researchers used data from two independent, Nicaragua-based studies headed by Eva Harris, professor of infectious diseases and vaccinology and director of UC Berkeley’s Center for Global Public Health, and Dr. Angel Balmaseda, director of the National Viology Laboratory in Nicaragua. One was a hospital-based study that examined children admitted to the National Pediatric Reference hospital with dengue between 2005 and 2009. The other was a prospective study that had followed 3,800 children since 2004, with blood samples collected annually.

By following dengue cases in both studies, researchers were able to identify a dramatic increase in severe dengue disease and then sequence the virus across time. They detected genetic changes in the virus that coincided with changes in disease severity, but only in the context of pre-existing immune response to specific dengue virus serotypes.

They found that children who had antibodies to dengue virus 3, which circulated in the region from 1994-1998, were at greater risk for developing severe infections when exposed to subtype 2B of dengue virus 2. They also found that children who had antibodies to dengue virus 1, which circulated from 2002-2005, were also at increased risk of severe disease from exposure to subtype 1 of dengue virus 2 after an initial period of immunity wears off.

"We showed for dengue that both the subtype of virus you get infected with and whether your body has antibodies to another type of virus matter," said Matthew Henn, director of viral genomics at the Broad Institute. "If you get the wrong combination of the two, you are more likely to get severe disease. This study provides a framework we can utilize to eventually predict which specific virus types will proliferate in different human populations. We lacked a good model for this previously."

The researchers followed up with tests in the lab to confirm the complex interplay of viral genetics and immune system response.

Harris understands this risk on a personal level. She has been studying dengue in Nicaragua for 24 years, and in 1995, became infected with dengue virus type 3. That puts her at greater risk for a severe reaction should she become exposed to other dengue virus serotypes.

While no vaccine yet exists for dengue, Harris noted that the vaccines currently under development aim to immunize against all types of the virus.

"Our findings have implications for vaccine development and implementation, as the precise genetics of vaccine strains, as well as the timing and serotype sequence of infection prior to and after vaccination, play an important role in determining the outcome of infection," she said.

Harris added that this study benefitted from decades of productive collaboration between U.S. and Nicaraguan researchers. "It was the multi-disciplinary approach we took to analyzing two high-quality studies that allowed us to untangle this very complex phenomena," she said.
Self-regulation of the immune system suppresses defense against cancer

It is vital that the body's own immune system does not overreact. If its key players, the helper T cells, get out of control, this can lead to autoimmune diseases or allergies. An immune system overreaction against infectious agents may even directly damage organs and tissues.

Immune cells called regulatory T cells ("Tregs") ensure that immune responses take place in a coordinated manner: They downregulate the dividing activity of helper T cells and reduce their production of immune mediators. "This happens through direct contact between regulatory cell and helper cell," says Prof. Peter Krammer of DKFZ. "But we didn't know yet what this contact actually causes in helper cells." The researchers' hypothesis was that the contact with the Tregs affects certain steps in the complex signaling cascade that leads to the activation of the helper T cells.

If the T cell receptor, a sensor molecule on the surface of helper cells, senses foreign or damaged protein molecules, this will trigger a cascade of biochemical activation reactions. At the end of this signaling cascade, genes that are required for an immune attack will be read in the nucleus of helper cells.

Jointly with colleagues from several German research institutes, Peter Krammer, Angelika Schmidt and co-workers have now compared the signaling cascades in helper cells with and without contact to Tregs. The immunologists found out that a short contact of the two types of cells in the culture dish is sufficient to suppress the helper cells. Following Treg contact, the typical release of calcium ions into the plasma of helper cells does not occur. As a result, two important transcription factors, NFκB and NFAT, do no longer function. They normally activate genes for immune mediators, thus alerting the immune system.

"The mode of action of Tregs is of great importance for cancer medicine. Many of our colleagues have shown in various types of cancer that Tregs can downregulate the immune response against tumors so that transformed cells escape the immune defense. This can contribute to the development and spread of cancer. We are therefore searching for ways to reactivate such suppressed helper cells," said Krammer, explaining the goals of his work. For developing immune therapies against cancer it is also crucial to understand how Tregs work. The researchers are trying to prevent that immune cells which have been painstakingly activated against cancer in the culture dish are immediately suppressed again by Tregs.

Disease-causing strains of Fusarium prevalent in plumbing drains

A study examining the prevalence of the fungus *Fusarium* in bathroom sink drains suggests that plumbing systems may be a common source of human infections.

State's College of Agricultural Sciences sampled nearly 500 sink drains from 131 buildings—businesses, homes, university dormitories and public facilities—in Pennsylvania, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida and California.

They analyzed fungal DNA to compare the spectrum of *Fusarium* species and sequence types found in drains with those recovered from human infections.

The study identified at least one *Fusarium* isolate in 66 percent of the drains and in 82 percent of the buildings. About 70 percent of those isolates came from the six sequence types of *Fusarium* most frequently associated with human infections.

"With about two-thirds of sinks found to harbor *Fusarium*, it's clear that those buildings' inhabitants are exposed to these fungi on a regular basis," said lead investigator Dylan Short, who recently completed his doctorate in plant pathology. "This strongly supports the hypothesis that plumbing-surface biofilms serve as reservoirs for human pathogenic fusaria."

The researchers published their results in the December issue of the *Journal of Clinical Microbiology*.

*Fusarium* may be best known for causing a variety of diseases in agricultural crops. In Pennsylvania, *Fusarium* diseases of grains and greenhouse crops are of particular concern. *Fusarium* species also produce mycotoxins in association with plants, causing a direct health threat to animals and humans that eat the plants.
Some species of *Fusarium* also cause opportunistic and sometimes fatal infections in humans, typically entering the body through wounds or trauma, via catheters and intravenous devices or by introduction of a biofilm to the eye. While relatively rare, *Fusarium* infections can be difficult to treat because of the organism’s resistance to many antifungal drugs. Those most at risk are individuals with weak or compromised immune systems.

In one high-profile case, *Fusarium* was found to have caused a widely publicized 2005-06 outbreak of fungal keratitis— infection of the cornea—among contact-lens wearers.

"In the recent outbreaks of fungal keratitis in Southeast Asia and North America connected to contact-lens use, plumbing systems were the main environmental sources of the most frequent *Fusarium* species and sequence types associated with eye infections," Short said.

He explained that biofilms on plumbing surfaces are known to comprise a diverse spectrum of fungi and other microbes. "Based on its very high frequency, it is clear that *Fusarium* is a ubiquitous component of biofilm microbial communities in plumbing systems," he said. "The adaptations that make *Fusarium* biofilm growth possible also may facilitate infection of humans.

"For example, in the 2005-06 mycotic keratitis outbreak, it was hypothesized that improper use of a contact lens solution led to reduced efficacy of its antimicrobial properties, which allowed fusaria to establish biofilms on contact lens surfaces and in lens cases," he said.

"The biofilm also may play an important role in established infections in humans by protecting the fungus from drug treatments, since biofilm-phase fusaria tend to be more resistant to antifungal drugs than those growing in a fluid medium."

Of the 59 sequence types identified from sinks in this study, 32 had not been found in previous multilocus sequence typing studies of *Fusarium*. These novel types included members of four apparently new *Fusarium* species.

David Geiser, professor of plant pathology and a member of the research team, pointed out that the serious infections caused by fusaria are relatively uncommon and that these fungi may even play positive roles in plumbing systems. But he said the study provides the strongest evidence to date supporting an epidemiological link between human fusarioses and plumbing systems.

"Our apparently constant physical proximity to these fungi belies their relative obscurity in terms of public awareness and understanding by the scientific community," said Geiser, who also is director of Penn State’s *Fusarium* Research Center, which houses the world’s largest collection of *Fusarium*.

"The species involved offer significant potential for studying host-microbe interactions, novel metabolic activities—including the production of mycotoxins and antibiotics—and the roles of microbes in indoor environments," he said.

**Novel Use of Drug Saves Children from Deadly E. Coli Bacteria Disease**

ScienceDaily (Dec. 19, 2011) — A physician and researcher at the Sainte Justine University Hospital Center (Sainte-Justine UHC), a University of Montreal affiliate, saved the life of a child and, by doing so, became the first to find a new use for a drug in the fight against deadly *E. coli* bacteria.

"The dramatic improvement experienced by the young patient and two others is explained in an article published last summer in the *New England Journal of Medicine*."

"At the time, there was no recognized treatment to cure the hemolytic and uremic syndrome, a severe complications associated with *E. coli* infections," says Dr. Anne-Laure Lapeyraque, a nephrologist in the Department of Pediatrics at the Sainte Justine UHC as well as a professor at the University of Montreal. "Successful use of this medication in these children has opened our eyes to a promising new treatment."

Dr. Anne-Laure Lapeyraque and her international colleagues relate how eculizumab was used to treat three 3-year-olds with *E. coli*-related neurological complications. Within a few days to weeks, their blood counts returned to normal and their kidneys recovered. Eculizumab, a drug known as a monoclonal antibody, acts by blocking a substance in the immune system known as complement protein C5.

Once this new drug application had been discovered, intravenous eculizumab therapy was used to save the lives of a large number of people. "Our report was published during the massive *E. coli* outbreak in May and June in Germany, which allowed us to break the news and alert physicians," explains Dr. Lapeyraque. During the outbreak, about 4,000 people in Europe fell ill by eating contaminated sprouts.
E. coli infection with a Shiga toxin-producing strain ("hamburger disease") has been the subject of several recalls of contaminated beef in Canada and the United States over the past few years. E. coli can be found in undercooked ground beef, unpasteurized (raw) dairy products and contaminated fruits and vegetables, particularly alfalfa sprouts. Symptoms include cramps and vomiting, with or without bloody diarrhea, and can lead to kidney failure and be life threatening. This is why it is important to cook hamburger meat thoroughly, wash fruits and vegetables, avoid unpasteurized dairy products, especially for children, and wash one’s hands after handling raw meat. According to Dr. Lapeyraque, these precautions have greatly reduced the incidence of E. coli infection in Quebec.

The investigators on this international clinical team are very excited about their discovery. For one thing, it helps explain how and why hamburger disease can develop with such devastating consequences. "Further research studies are needed to determine which patients will benefit from it the most," adds Dr. Lapeyraque. In any event, "eculizumab" is now a hot buzzword at kidney disease meetings around the world.

Journal Reference:

Mapping Antibiotic Use and Resistance
New data reveals troubling trends in the pharmaceutical fight against bacteria.
By Bob Grant | November 17, 2011

Though rates of antibiotic use across the United States have been decreasing, people in Southeast regions of the country take about twice as many antibiotics as residents of the Northwest, according to a new analysis that tracked use of the drugs from 1999 to 2007. West Virginia, Kentucky, Tennessee, Louisiana, and Alabama were the five states with the highest antibiotic use, while Alaska, Oregon, California, and Washington had the lowest use rates. As a whole, the United States had a lower combined resistance score—meaning antibiotic-resistant pathogens are less of a problem—than some countries in Eastern and Southern Europe, but had a higher score than many Nordic countries and European powers, such as the UK and Germany.

While overall antibiotic use in the United States dropped by 12 percent during the study period, according to the report published yesterday on the website of the Center for Disease Dynamics, Economics & Policy (CDDEP), prescribing rates for a powerful class of antibiotics known as fluoroquinolones increased by 49 percent. The alarming thing from an epidemiological standpoint is that fluoroquinolones are now seven times less likely to work against Escherichia coli than they were in 1999. Meanwhile, the market share of penicillins, which have long been the most popular of antibiotics, has declined by 28 percent, with doctors instead prescribing increasingly powerful antibiotics.
In conjunction with releasing this resistance data, Extending the Cure, a project of the CDDEP, also published a paper this week detailing a new method for tracking trends in antibiotic resistance. Appearing in *BMJ Open*, the *study* describes how the Drug Resistance Index (DRI) operates something like a Consumer Price Index for antibiotic resistance, aggregating information about trends in *E. coli* and *Acinetobacter baumannii* resistance and antibiotic use into a single measure of antibiotic resistance over time. The researchers calculated that DRI in the United States for *E. coli* rose from 0.25 to 0.30 from 1999 to 2006, and the DRI for *Acinetobacter* spp. increased from 0.41 to 0.48 over that same time period.

“Mapping the geography of antibiotic use and summarizing their effectiveness with a Drug Resistance Index bring us one step closer to the solutions we urgently need in order to curtail this public health crisis,” said Ramanan Laxminarayan, director of Extending the Cure and author on the *BMJ Open* paper. “If we do nothing, resistance will continue to develop and our most valuable antibiotics ultimately will fail.”

—ravi_c4u

i think some pharma industries and physicians are playing with lives of human being, many time we see that for common cold also they will prescribe very powerfull or third/fourth generation antibiotics as if like they have been given a target for completing turnover of some perticular brand, they are not even thinking about coming generations, small childrens are also being treted with high doses of antibiotics

—quatra
It should be a biological fight, not a pharmaceutical one. Phages are the natural enemies of bacteria and each type of bacteria has one, or more of them. Bacteria cannot become resistant to the phages. The problem is that there's no money to be made, so nobody is really interested in investing in research. The Soviet Union had successful a program going on about 30 years ago.

Perhaps it’s time to think about moving the clock back.

The nitrofurans were developed before the natural products and derivatives that are presently called antibiotics came into widespread use.

Nitrofurans apparently don’t induce resistance. Unfortunately, most are genotoxic (at least to microorganisms) or have a genotoxic alert via their metabolites; this seems to be their mode of action.

They are banned in animal feed because of the genotoxic residues, but not always in humans...

A certain calculated level of risk is accepted for diagnostic ionising radiation, but the rules seem to be more complicated for drugs. Since the situation with antibiotics is becoming critical it might be worth re-examining nitrofurans and any other old products that have been superseded, in case they could be deployed in times of crisis.

Possibly, nitrofurans could serve as a lead for the development of new antimicrobial compounds. How to get approval and finance for such a project is left as an exercise for the reader.

Non-coding RNAs Halt Cell Death

Long, non-coding regions of RNA can prevent red blood cells from committing suicide during the final stage of differentiation.

By Tia Ghose | December 7, 2011

Researchers have discovered yet another role for long-noncoding RNAs (lncRNAs): preventing cell suicide in red blood cells. The findings, published today (December 7) in *Genes and Development*, suggest that lncRNAs could play a role in fueling certain types of leukemia, which often have lower levels of programmed cell death, or apoptosis.

Only 10 percent of RNA is used as a template for creating proteins; the role of the other 90 percent is a mystery scientists have only begun to crack. Some RNA molecules are known to inhibit translation, for example, and a tiny fraction of non-coding RNAs of 200 base pairs or more have previously been shown to upregulate genes.

In the current study, researchers at the Whitehead Institute in Massachusetts found one particular lncRNA that was highly expressed in red blood cells from mouse livers. When they blocked expression of the molecule in maturing red blood cells, the cells underwent apoptosis in the final differentiation stage. Adding lncRNA to cells that would normally commit suicide allowed the cells to stay alive. Further digging revealed that the lncRNA inhibited a gene that normally promotes cell suicide.

The findings could have implications for cancer, as turning off cell suicide is one of the hallmarks of cancer progression. “We would not be surprised to find this lncRNA or others like it upregulated in cancer,” co-author and Whitehead biologist Harvey Lodish said in a press release.

A Possible Ebola Vaccine?

A new Ebola vaccine candidate protects mice against death and can be produced quickly in response to a bioterrorism threat.

By Tia Ghose | December 5, 2011

Researchers have a new hope in the fight against the possibility of a biological attack—an Ebola vaccine that protects mice from the hemorrhagic fever's deadly grip. The vaccine combines antigens with a protein in complex to prime a more robust immune response, and can be grown quickly in tobacco plants, making it feasible to quickly ramp up production in the event that the Ebola virus is released as part of a terrorist attack, according to the study published Monday (December 5) in the *Proceedings of the National Academy of Sciences*.

The combination of an antibody, an antigen, and an immune booster is novel,—said Erica Ollmann Saphire, a structural biologist at Scripps Research Institute in La Jolla, Calif., who was not involved in the study. —“Your immune systems see those [complexes] as the kinds of things that happen in infection, so you mount a stronger immune response” than when exposed to vaccines that use just a fragment of the virus outer shell. And because “they’ve made it in plants,” she added, “it’s very inexpensive.”
Every several years, Ebola emerges from its natural reservoirs in African forests and causes human outbreaks, killing 50 to 90 percent of the people infected. The lethal disease depletes the clotting factor in victims’ blood, causing them to hemorrhage internally, said co-author Melissa Herbst-Kralovetz, an immunologist at Arizona State University (ASU). The US government increased funding for Ebola vaccine research after September 11 because of its potential use in a bioterrorism attack.

The virus’s remote endemic region and rare occurrence means “there’s just no practical way we would start immunizing everyone” before they’ve been exposed, said co-author Charles Arntzen, an infectious disease specialist at ASU. Yet Ebola kills so quickly that by the time the immune system has recognized the virus and mounted a response, a victim is usually dead. The key is to provide infected people with an instant dose of antibodies at first, while also priming the immune system to develop long-lasting immunity.

One problem that has plagued researchers looking to develop an Ebola vaccine, however, is how to produce large quantities of the outer shell glycoprotein that the body uses to recognize the Ebola virus. When the glycoprotein accumulated in the transgenic yeast or mammalian cells used to mass-produce it, the cells would die, Arntzen said.

But by fusing the glycoprotein with an antibody that helps the immune system recognize the protein, plant cells view the complex as completely unknown type of molecule and simply shuttle the complex to storage vacuoles where they are harmless. As a result, the immune complex can be grown in transgenic tobacco plants, which can produce the vaccine more quickly than yeast or mammalian cells. Furthermore, production can be scaled up as needed, making it a feasible method for building a government stockpile.

But while the complex is harmless to the plants, when injected into mice, the immune system more easily recognizes the large complex as a potential threat and triggers a stronger response than just the glycoprotein alone,—while an immune booster works to further accelerate the body’s immune response. In a separate paper in PNAS, researchers reported an efficient method of producing large quantities antibody to provide immediate post-exposure protection from the virus. The two compounds could theoretically be used together to provide long-lasting protection after Ebola infection, Arntzen.

Testing the vaccine on mice exposed to a lethal dose of Ebola, “to our delight the mouse immune system responds beautifully to the antibody complex,” Arntzen said, and about 80 percent of the mice survived.

But like all other Ebola vaccines in development, the work is far from over, said Chad Roy, an infectious disease aerobiologist at Tulane National Primate Research Center, who was not involved in the study. “It’s a great first step, but boy are there a lot of other steps.”

The study was done in mice, but because Ebola virus isn’t normally lethal to mice, the vaccine was tested against a modified version of the virus. The protection should be shown in another mammal species, likely rabbits or guinea pigs, and then verified in a primate species such as a macaque, Roy said.

Next the vaccine would be tested for safety and its ability to stimulate an immune response in humans. Finally, there’s the hurdle of testing the vaccine’s efficacy in people. Because it’s not ethical to administer the virus to healthy individuals, the only option is to “just sit and wait” until there’s a natural outbreak of the disease, Arntzen said. “We know there will be another Ebola outbreak sometime, we just don’t know where or when.” (Stay tuned for The Scientist’s upcoming January feature on other Ebola vaccines in development, and one company’s attempt to sidestep human efficacy trials by testing flu patients.)


**Matters of Taste** (long)

Compounds we perceive as sweet or bitter in the mouth trigger similar receptors and signaling pathways elsewhere in the body, helping to regulate digestion, respiration, and other systems.

By Thomas E. Finger and Sue C. Kinnamon | December 1, 2011

In the choice of what to ingest, the sense of taste is both a guardian and a guide. The sensations of bitter and sour keep us from eating potentially toxic substances and strong acids, while the preferred qualities of sweet, umami (the “savory” taste of glutamate), and salty drive intake of carbohydrates, amino acids, and sodium, respectively. Taste sensations are mediated by taste buds—small clusters of specialized epithelial cells on the tongue, soft palate, and larynx. Over the last two decades, as scientists have uncovered the
array of G protein–coupled receptor (GPCR) cascades and ion channels that underlie taste signaling, they have also discovered, to their surprise, that the expression of these receptors and channels is not limited to taste buds. Indeed, elements of the taste transduction cascade occur in many chemoresponsive epithelial cells scattered throughout the stomach, the intestines, and even the airways. Despite the similarities in receptor molecules and signaling cascades, however, only the chemoreceptive systems in the mouth evoke a sensation of taste. The others, researchers are learning, serve different functions depending on their location.

The taste transduction story

The sensations of taste are divisible into five distinct qualities: salty, sour, bitter, sweet, and umami. Salty and sour sensory perceptions rely on ion channels, which are expressed in a variety of tissues, such as kidney, as well as in taste buds. Bitter, sweet, and umami qualities rely predominantly on two distinct families of GPCRs, Tas1R and Tas2R (T1R and T2R), first identified in taste tissues in 1999, but subsequently identified in other tissues, including gut and airway epithelia. Despite the difference in the qualities detected by the two families of taste receptors, both utilize similar, if not identical, downstream signaling effectors, including the taste receptor-associated G protein α-gustducin, one of the first identified proteins of a GPCR taste transduction cascade.

In 1996, researchers at the University of Würzburg reported that α-gustducin is expressed by brush cells of the stomach and intestine. Brush cells are tall, columnar epithelial cells that display a distinctive tuft of stiff microvilli at their apex. Based on morphological features, researchers had suspected that these cells were chemosensory, but the findings of gustducin, taste receptors, and the ion channel TrpM5, another taste transduction element, confirmed this early speculation, and suggested that brush cells detect nutrients in the gut. In the last 15 years, researchers have uncovered more and more taste cascade elements throughout the digestive tract, and even in the airways, suggesting a widespread distribution of complete taste transduction cascades—from taste receptor to transduction channel.

These seemingly misplaced taste-like pathways do not, however, give rise to sensations of taste, though they appear to detect compounds known to elicit a taste response in the mouth. Instead, these compounds initiate the taste transduction cascade with the end result of inducing particular physiological changes. For example, the pancreatic release of insulin in response to glucose is partially mediated by the binding of glucose to sweet-taste receptors on cells of the intestine and subsequent activation of the signaling cascade. Similarly, accidental inhalation of a beverage into the airways triggers taste receptors there, but rather than evoking a sensation of taste, the substance is irritating and provokes choking or coughing. (Although we use the phrases “taste transduction” and “taste receptors” below, we do not mean to imply that these equate to a perception of taste.)

Indeed, for every taste transduction cascade discovered outside the oral cavity, researchers seek to uncover the functional significance of the chemoresponsive cells in those areas. Taken together, the findings suggest that the taste transduction cascade is not restricted to the sensation of taste per se, or even to systems regulating food intake. In fact, the receptors mediating taste transduction appear to have evolved early in the vertebrate lineage, and to have since been widely adopted as a chemodetection system in a variety of organ systems.

“Taste” in the gut

In taste buds, receptors of the T1R family combine to form either a sweet receptor (T1R2 + T1R3) or an umami receptor (T1R1 + T1R3), and signal the presence of macronutrients necessary for survival: a carbohydrate energy source or amino acids, respectively. In the gut, the presence of sweet substances is detected by hormone-producing cells known as enteroendocrine cells that respond by secreting the glucagon-like peptide GLP-1, which in turn stimulates the release of insulin from pancreatic β-cells. The presence of circulating insulin results in the uptake of glucose from the bloodstream by diverse tissues. In addition, activation of the sweet receptors in the gut drives the insertion of the glucose transporters SGLT-1 and GLUT2 into the membranes of cells lining the intestines, thereby facilitating uptake of glucose.
While the presence of T1R-class receptors for macronutrients in the gut is an obvious means to regulate digestive functions, the function of widespread T2R bitter receptors throughout the GI tract is less clear. Researchers have shown in vitro that activation of T2R receptors in an enteroendocrine cell line results in release of the peptide hormone cholecystokinin (CCK), which can reduce gut motility. Thus, intake of a potential toxin that activates the T2R pathway should decrease the rate at which food passes through the stomach and lower the drive for continued eating. Nonetheless, a recent study suggests that the lowered gut motility following intake of bitter substances is not dependent on T2R signaling, nor on CCK, leading researchers to reconsider the function of the receptors in this context.

One possibility is that the CCK-secreting enteroendocrine cells are involved in a local epithelial signaling system that reduces transfer of toxic substances from gut into circulation. The CCK released from T2R-expressing enteroendocrine cells in response to stimulation by some bitter-tasting ligands may act on CCK2 receptors located on nearby intestinal epithelial cells, called enterocytes, which regulate the absorption of molecules from the intestinal lumen into the bloodstream. In vitro studies show that activating CCK2 receptors on these cells increases expression of the transporter ABCB1, which pumps out toxins or unwanted substances from the cytoplasm, allowing the toxins to be excreted rather than absorbed into the blood. Thus, activation of T2R signaling in the intestines indirectly results in increased elimination of absorbed toxins from gut epithelium before the toxins can enter circulation.

Lower in the gut, activation of T2R receptors similarly appears to combat toxins, though via a different mechanism. When some bitter-tasting ligands bind to epithelial cells in the colon, they induce the secretion of anions, which leads to fluid secretion into the intestine. This induced efflux of fluids is likely to flush out any noxious irritant from the colon, resulting in diarrhea.

**“Taste” in the airways**

Three years after taste-related signaling components were discovered in the gut, Zancanaro and colleagues at the University of Verona described the presence of gustducin-expressing cells in the airway. Specifically, the researchers examined mice and identified gustducin-expressing cells scattered in the epithelium lining the incoming ducts of the vomeronasal organ, a specialized part of the olfactory system found in many vertebrates, but not in adult humans. Such cells were also identified in the nasal respiratory epithelium. The morphology of these cells is similar to chemosensory cells scattered within the epidermis of fishes, first described by Mary Whitear in the 1970s. In a series of elegant ultrastructural studies, she identified a distinctive type of epithelial cell that extends through the height of the epithelium with microvillous extensions at its apical end. Since these cells also form extensive synapses at their base with local nerve fibers, Whitear suggested they must be a sensory cell type. Furthermore, since the apical specializations were not rigid, she deduced that the cells could not be mechanosensory, and therefore were likely chemosensory elements. Later, two physiological studies on fish with specialized appendages rich in solitary chemosensory cells confirmed the chemoresponsiveness of this system, although the identity of the natural stimulus remains controversial.
Subsequently, we and others showed that morphologically and molecularly similar solitary chemosensory cells (SCCs) are present throughout the upper respiratory systems of alligators, mice, and rats; and in the rodents, the cells express the entire panoply of taste-related signaling molecules, including T2R receptors, gustducin, PLCβ2, and the transduction channel TrpM5.34 In 2003, we confirmed that the taste signaling cascade is necessary for activation of the SCCs of the nasal cavity.11 These SCCs synapse onto polymodal pain fibers of the trigeminal nerve, which produce a sensation of irritation and pain when activated. In addition, activation of these fibers evokes protective airway reflexes such as apnea (to prevent further inhalation) and sneezing (to remove the irritant). Thus, inhalation of a toxin that activates T2R receptors will be irritating and will provoke changes in respiration,12 but will not, of course, produce the sensation of a bitter taste.

More recently, we showed that even some bacterial metabolites and signal molecules can activate the nasal SCCs and the trigeminal nerve.13 Upon activation, the trigeminal nerve fibers not only transmit the information towards the brain, but also release peptide modulators (such as substance P and calcitonin gene-related peptide) into the local tissue, including around nearby blood vessels. These modulators bind to receptors on mast cells and blood vessels, causing a local, neurally mediated inflammation of the airway lining. In this way, SCCs not only act as sentinels warning against inhalation of irritants, but also serve as guardians capable of activating the innate immune system to respond to the presence of potentially damaging toxins or pathogens.

In all of the examples described so far, the taste signaling cascade is used to detect molecules in the lumen of an organ (oral cavity, gut, respiratory passages), and to generate an intracellular cascade to effect release of a neurotransmitter or hormone to signal to other cells in the body. Two recent reports on the expression of taste receptors in the airways indicate that taste–receptor signaling may directly affect the function of the cell that actually detects the stimulus (i.e., a cell-autonomous effect). Last year, Deshpande and colleagues reported that human airway smooth muscle cells express T2R (bitter) taste receptors along with α-gustducin and some components of the taste-associated phospholipase C (PLC) arm of the signaling cascade.3 Application of various bitter-tasting substances to cultured human airway smooth muscle cells shows the same PLC-dependent increases in intracellular Ca2+ typical of taste cells or solitary chemosensory cells. Surprisingly, however, these increases in intracellular Ca2+ caused relaxation, rather than contraction, of the muscle cells. This paradoxical effect is attributed to the proximity of the T2R receptor complex to calcium-activated potassium channels (BKCa channels), which open in response to increased intracellular Ca2+, causing the hyperpolarization and subsequent relaxation of the muscle cells. In contrast, in taste cells of the mouth and solitary chemosensory cells of the upper airways, the increase in intracellular Ca2+ as a result of T2R activation triggers the transduction channel TrpM5 to depolarize the cell and evoke transmitter release to stimulate other cells. Thus, in different signaling contexts, activation of the same receptor can produce opposite cellular-level effects. However, two recent letters to the editor call Deshpande’s results into question, so the resolution of this remains controversial. T2R activation has also been reported to have a cell-autonomous effect in ciliated cells of human lower airways.14 Cultured human airway epithelium expresses some T2Rs along with associated downstream elements. Curiously, these are the first cells with motile cilia known to express sensory signaling elements. In these cells, the T2Rs are present on the cilia, while PLCβ2 is associated with the cell membrane where the cilia insert into the cell body. Binding of the T2R receptor by a bitter ligand initiates a transduction cascade to activate PLCβ2 at the base of the cilium, generating a Ca2+ response. The resulting T2R-mediated increase in intracellular Ca2+ causes an increase in ciliary beat frequency, which the researchers suggest could serve to sweep irritants away from the surface of the cell. But while T2Rs can be detected in cultured human airway cells, they are not detected in the lower airways of mice.15 Whether this represents a species difference or the difference between in vivo and in vitro states remains to be determined.

Remaining taste mysteries
It is evident that taste receptors and their associated downstream signaling components are widely dispersed in diverse organ systems, and in many cases serve to help with digestion or to protect cells from potential toxins. But taste receptors have also been identified in other organs and tissues, such as the bile ducts, where their functions are still unclear. The composition of the fluid in the bile ducts is dictated by secretions of the pancreas, liver, and gall bladder. Why should it be necessary to diligently monitor the composition of biliary fluids as they move from gall bladder to intestine?

Similarly enigmatic are the reported effects of T2R (bitter receptor) agonists on contractile elements of both the airway and the gut. In the trachea, T2R agonists cause muscle relaxation (see above), but it is not clear how a bitter substance would have access to the smooth muscle cells of the trachea under normal conditions. The smooth muscle of the trachea is buried beneath a relatively tight airway epithelium, and
so it seems unlikely that an inhaled bitter substance would penetrate the epithelium to access T2R receptors on the muscle. Similarly, the inhibition of smooth muscle contractility by T2R agonists in the stomach is not mediated by any of the peptides released by dispersed endocrine (enteroendocrine) cells of the gut, and may not even be mediated by T2R receptors. These and other nonspecific effects of bitter ligands emphasize the need to utilize either well-defined pharmacological agents or, better still, knockout animals to establish the specificity of receptors and transduction pathways and the consequences of their activation. Though they may not be for tasting per se, the taste-family receptors are surely doing something to affect the physiology of the organs in which they reside.

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References

**Discovered the existence of neutrophils in the spleen**

These neutrophils are there without there being any infection and play an immunoregulating role

Barcelona, 23rd of December 2011.- For the first time, it has been discovered that neutrophils exist in the spleen without there being an infection. This important finding made by the research group on the Biology of B Cells of IMIM (Hospital del Mar Research Institute) in collaboration with researchers from Mount Sinai in New York, has also made it possible to determine that these neutrophils have an immunoregulating role.

Neutrophils are the so-called cleaning cells, since they are the first cells to migrate to a place with an infection and inflammation to destroy the pathogens. Until now, scientific literature had considered neutrophils essentially as lowly qualified soldiers that simply limited the expansion of an infection, as a first action to pave the way for other cells of the immune system in charge of eradicating the infection permanently.

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Image of B lymphocytes (in blue) surrounded by neutrophils (in green) and endothelial cells (in red) of a human spleen. The image on the left side corresponds to a normal spleen and on the right side to a spleen of a patient with neutropenia, where the presence of neutrophils is much lower. **Credit**: IMIM (Hospital del Mar Research Institute)
“This study has revealed that neutrophils are found in the spleen without there being an infection, contributing totally new knowledge in the field of biology” explains Andrea Cerutti, the coordinator of the research group on the Biology of B Cells of IMIM, a professor at ICREA and the last signatory of the article.

Researchers noticed that the existence of neutrophils in the spleen started when the fetus is developing, even when there is no infectious process involved; this was not known in scientific literature. The study was expanded to people of different ages and other mammals. Detecting the presence of neutrophils in the spleen suggested that these played a different role in the spleen to the one usually given to them.

The neutrophils in the spleen are located around B lymphocytes to help their activation and offer a first rapid response when there are pathogens. "through several different experimental approaches we have proven that neutrophils in the spleen acquire the ability to interact with B cells or B lymphocytes, inducing the production of antibodies, a role that lymphocytes circulating in blood are not able to do” states Irene Puga, researcher of the IMIM and a signatory of this article.

This finding improves the understanding of the mechanisms with which our immune system protects us against an infection, an essential requirement to better control all pathologies linked to it. Also, when faced with certain diseases, such as neutropenia (or a numeric deficiency of neutrophils), it will become necessary to study not only the deficiency of neutrophils, but also how this affects the production of antibodies.

This work opens the door to therapies which are geared at, and more affective against, different pathogens, for example, to develop vaccines to increase the capacity of neutrophils in the spleen so as to have an incidence on the production of antibodies by type B lymphocytes.

How Bacteria Build Homes Inside Healthy Cells

ScienceDaily (Dec. 20, 2011) — Bacteria are able to build camouflaged homes for themselves inside healthy cells—and cause disease—by manipulating a natural cellular process.

Purdue University biologists led a team that revealed how a pair of proteins from the bacteria *Legionella pneumophila*, which causes Legionnaires disease, alters a host protein in order to divert raw materials within the cell for use in building and disguising a large structure that houses the bacteria as it replicates.

Zhao-Qing Luo, the associate professor of biological sciences who headed the study, said the modification of the host protein creates a dam, blocking proteins that would be used as bricks in cellular construction from reaching their destination. The protein "bricks" are then diverted and incorporated into a bacterial structure called a vacuole that houses bacteria as it replicates within the cell. Because the vacuole contains materials natural to the cell, it goes unrecognized as a foreign structure.

"The bacterial proteins use the cellular membrane proteins to build their house, which is sort of like a balloon,” Luo said. "It needs to stretch and grow bigger as more bacterial replication occurs. The membrane material helps the vacuole be more rubbery and stretchy, and it also camouflages the structure. The bacteria is stealing material from the cell to build their own house and then disguising it so it blends in with the neighborhood."

The method by which the bacteria achieve this theft is what was most surprising to Luo.

The bacterial proteins, named AnkX and Lem3, modify the host protein through a biochemical process called phosphorylcholination that is used by healthy cells to regulate immune response. Phosphorylcholination is known to happen in many organisms and involves adding a small chemical group, called the phosphorylcholine moiety, to a target molecule, he said.

The team discovered that AnkX adds the phosphorylcholine moiety to a host protein involved in moving proteins from the cell's endoplasmic reticulum to their cellular destinations. The modification effectively shuts down this process and creates a dam that blocks the proteins from reaching their destination.

The bacterial protein Lem3 is positioned outside the vacuole and reverses the modification of the host protein to ensure that the protein "bricks" are free to be used in creation of the bacterial structure.

This study was the first to identify proteins that directly add and remove the phosphorylcholine moiety, Luo said.

"We were surprised to find that the bacterial proteins use the phosphorylcholination process and to discover that this process is reversible,” he said. "This is evidence of a new way signals are relayed within cells, and we are eager to investigate it."
The team also found that the phosphorylcholination reaction is carried out at a specific site on the protein called the Fic domain. Previous studies had shown this site induced a different reaction called AMPylation.

It is rare for a domain to catalyze more than one reaction, and it was thought this site’s only responsibility was to transfer the chemical group necessary for AMPylation, Luo said.

"Revealing that this domain has dual roles is very important to identify or screen for compounds to inhibit its activity and fight disease," he said. "This domain has a much broader involvement in biochemical reactions than we thought and may be a promising target for effective treatments."

During infection bacteria deliver hundreds of proteins into healthy cells that alter cellular processes to turn the hostile environment into one hospitable to bacterial replication, but the specific roles of only about 20 proteins are known, Luo said.

"In order to pinpoint proteins that would be good targets for new antibiotics, we need to determine their roles and importance to the success of infection," he said. "We need to understand at the biochemical level exactly what these proteins do and how they take over natural cellular processes. Then we can work on finding ways to block these activities, stop the infection and save lives."

A paper detailing their National Institutes of Health-funded work is published in the current issue of the Proceedings of National Academy of Sciences. In addition to Luo, Purdue graduate student Yunhao Tan and Randy Ronald of Indiana University co-authored the paper.

Luo next plans to use the bacterial proteins as a tool to learn more about the complex cellular processes controlled by phosphorylcholination and to determine the biochemical processes role in cell signaling.

**Journal Reference:**
Y. Tan, R. J. Arnold, Z.-Q. Luo. **Legionella pneumophila regulates the small GTPase Rab1 activity by reversible phosphorylcholination.** Proceedings of the National Academy of Sciences, 2011; DOI: [10.1073/pnas.1114023109](http://dx.doi.org/10.1073/pnas.1114023109)

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**How Bacteria Fight Fluoride in Toothpaste and in Nature**

ScienceDaily (Dec. 22, 2011) — Yale researchers have uncovered the molecular tricks used by bacteria to fight the effects of fluoride, which is commonly used in toothpaste and mouthwash to combat tooth decay.

In the Dec. 22 online issue of the journal Science Express, the researchers report that sections of RNA messages called riboswitches—which control the expression of genes—detect the buildup of fluoride and activate the defenses of bacteria, including those that contribute to tooth decay.

"These riboswitches are detectors made specifically to see fluoride," said Ronald Breaker, the Henry Ford II Professor and chair of the Department of Molecular, Cellular and Developmental Biology and senior author of the study.

Fluoride in over-the-counter and prescription toothpastes is widely credited with the large reduction in dental cavities seen since these products were made available beginning in the 1950s. This effect is largely caused by fluoride bonding to the enamel of our teeth, which hardens them against the acids produced by bacteria in our mouths. However, it has been known for many decades that fluoride at high concentrations also is toxic to bacteria, causing some researchers to propose that this antibacterial activity also may help prevent cavities.

The riboswitches work to counteract fluoride’s effect on bacteria. "If fluoride builds up to toxic levels in the cell, a fluoride riboswitch grabs the fluoride and then turns on genes that can overcome its effects," said Breaker.

Since both fluoride and some RNA sensor molecules are negatively charged, they should not be able to bind, he notes.

"We were stunned when we uncovered fluoride-sensing riboswitches" said Breaker. "Scientists would argue that RNA is the worst molecule to use as a sensor for fluoride, and yet we have found more than 2000 of these strange RNAs in many organisms."

By tracking fluoride riboswitches in numerous species, the research team concluded that these RNAs are ancient—meaning many organisms have had to overcome toxic levels of fluoride throughout their history. Organisms from at least two branches of the tree of life are using fluoride riboswitches, and the proteins used to combat fluoride toxicity are present in many species from all three branches.

"Cells have had to contend with fluoride toxicity for billions of years, and so they have evolved precise sensors and defense mechanisms to do battle with this ion," said Breaker, who is also an investigator with the Howard Hughes Medical Institute. Now that these sensors and defense mechanisms are known, Breaker said, it may be possible to manipulate these mechanisms and make fluoride even more toxic to bacteria. Fluoride riboswitches and proteins common in bacteria are lacking in humans, and so these
fluoride defense systems could be targeted by drugs. For example, the Yale team discovered protein channels that flush fluoride out of cells. Blocking these channels with another molecule would cause fluoride to accumulate in bacteria, making it more effective as a cavity fighter.

Fluoride is the 13th most common element in Earth's crust, and it is naturally present in high concentrations throughout the United States and elsewhere. Its use in toothpaste and its addition to city water supplies across the United States sparked a controversy 60 years ago, and the dispute continues to this day. In the United Kingdom, and in other European Union countries, fluoride is used to a much lesser extent due to fierce public opposition.

The new findings from Yale only reveal how microbes overcome fluoride toxicity. The means by which humans contend with high fluoride levels remains unknown, Breaker notes. He adds that the use of fluoride has had clear benefits for dental health and that these new findings do not indicate that fluoride is unsafe as currently used.

**Journal Reference:**


### Built-In 'Self-Destruct Timer' Causes Ultimate Death of Messenger RNA in Cells

ScienceDaily (Dec. 22, 2011) — Researchers at Albert Einstein College of Medicine of Yeshiva University have discovered the first known mechanism by which cells control the survival of messenger RNA (mRNA)—arguably biology's most important molecule. The findings pertain to mRNAs that help regulate cell division and could therefore have implications for reversing cancer's out-of-control cell division. The research was recently described in the journal *Cell*.

"The fate of the mRNA molecules we studied resembles a Greek tragedy," said the study's senior author, Robert Singer, Ph.D., co-director of the Gruss Lipper Biophotonics Center and professor and co-chair of anatomy and structural biology at Einstein. "Their lifespans are determined at the moment of their birth." The study was carried out in yeast cells using advanced microscope technology developed previously by Dr. Singer that has allowed scientists, for the first time, to observe single molecules in single cells in real time.

Directions for making proteins are encoded in the DNA sequences of genes, which reside on chromosomes in the nucleus of each cell. But for proteins to be made, a gene's DNA code must be copied, or transcribed, onto mRNA molecules, which migrate from the nucleus and into the cytoplasm where the cell's protein-making machinery is located. For as long as it exists, an mRNA molecule can act as a template for making copies of a protein. So scientists have long suspected that cells must have ways for degrading mRNAs when, for example, a protein starts accumulating to harmful levels. "The cell somehow decides to destroy its mRNA on cue, but nobody knew how this happens," said Dr. Singer.

In their search for such a mechanism, Dr. Singer and his colleagues focused on two genes, *SWI5* and *CLB2*, which code for proteins that regulate the cell cycle—the complex series of steps during which a cell divides, first duplicating its genetic material and then distributing it evenly to two daughter cells. To properly choreograph the cell cycle, the levels of the proteins encoded by the *SWI5* and *CLB2* genes must be exquisitely controlled—suggesting that the mRNAs made from these genes would be prime candidates for purposeful degradation. Remarkably, the researchers found that these mRNAs are, in effect, born with molecular "self-destruct timers" that ultimately destroy them.

When genes are transcribed, a part of the gene called the promoter region has the job of switching on the gene so that DNA will be copied into mRNA. The Einstein scientists found that the promoter regions of the *SWI5* and *CLB2* genes do something else as well: they recruit a protein called Dbf2p, which jumps onto mRNA molecules as they're being synthesized. These mRNAs—transcribed from the *SWI5* and *CLB2* genes and bearing the Dbf2p protein—make their journey from the nucleus into the cytoplasm. Here a protein called Dbf20p joins Dbf2p aboard the mRNA molecules—and the two proteins together call for the molecules' precipitous decay.
"Our findings indicate that genes making proteins whose levels must be carefully controlled contain promoter regions that sentence their mRNA molecules to death even as the mRNA is being born," said Dr. Singer. "The promoter regions do that by 'marking' the newly made mRNA with the protein Dbf2p—the common factor between mRNA synthesis and its ultimate decay. Dbf2p stays attached to the mRNA from its birth and then, responding to a signal indicating that no more protein should be made, orders mRNA's destruction."

While these observations pertain to yeast cells, Dr. Singer said he is confident that the process governing mRNA decay in humans "will prove to be very similar" and could be relevant for combating cancer. "Once you gain insight into the mechanisms controlling the cell cycle and cell division," he noted, "you can propose targeted therapies for regulating the uncontrolled cell division that characterizes cancer."

Journal Reference:

Microbial communities on skin affect humans' attractiveness to mosquitoes
The microbes on your skin determine how attractive you are to mosquitoes, which may have important implications for malaria transmission and prevention, according to a study published Dec. 28 in the online journal PLoS ONE.

Without bacteria, human sweat is odorless to the human nose, so the microbial communities on the skin play a key role in producing each individual's specific body odor. The researchers, led by Niels Verhulst of Wageningen University in the Netherlands, conducted their experiments with the Anopheles gambiae sensu stricto mosquito, which plays an important role in malaria transmission. They found that individuals with a higher abundance but lower diversity of bacteria on their skin were more attractive to this particular mosquito. They speculate individuals with more diverse skin microbiota may host a selective group of bacteria that emits compounds to interfere with the normal attraction of mosquitoes to their human hosts, making these individuals less attractive, and therefore lower risk to contracting malaria. This finding may lead to the development of personalized methods for malaria prevention.

Citation: Verhulst NO, Qiu YT, Beijleveld H, Maliepaard C, Knights D, et al. (2011) Composition of Human Skin Microbiota Affects Attractiveness to Malaria Mosquitoes. PLoS ONE 6(12): e28991. doi:10.1371/journal.pone.0028991

HIV Study Named '2011 Breakthrough of the Year' by Science
ScienceDaily (Dec. 23, 2011) — The journal Science has chosen the HPTN 052 clinical trial, an international HIV prevention trial sponsored by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, as the 2011 Breakthrough of the Year. The study found that if HIV-infected heterosexual individuals begin taking antiretroviral medicines when their immune systems are relatively healthy as opposed to delaying therapy until the disease has advanced, they are 96 percent less likely to transmit the virus to their uninfected partners.

Findings from the trial, first announced in May, were published in the New England Journal of Medicine in August. The complete top 10 list of 2011 scientific breakthroughs appears in the Dec. 23, 2011, issue of Science.

"The HPTN 052 study convincingly demonstrated that antiretroviral medications can not only treat but also prevent the transmission of HIV infection among heterosexual individuals," said NIAID Director Anthony S. Fauci, M.D. "We are pleased that Science recognized the extraordinary public health significance of these study results. This recognition also is a credit to the hard work and dedication of the HPTN 052 researchers and the more than 3,000 study participants who selflessly gave their time and energy to make such a significant contribution to the fight against HIV/AIDS."

Led by study chair Myron Cohen, M.D., director of the Institute for Global Health and Infectious Diseases at the University of North Carolina at Chapel Hill, HPTN 052 began in 2005 and enrolled 1,763 heterosexual couples in Botswana, Brazil, India, Kenya, Malawi, South Africa, Thailand, the United States and Zimbabwe. Each couple included one partner with HIV infection. The investigators randomly assigned each couple to either one of two study groups. In the first group, the HIV-infected partner immediately began taking a combination of three antiretroviral drugs. The participants infected with HIV were extensively counseled on the need to consistently take the medications as directed. Outstanding compliance resulted in the nearly complete suppression of HIV in the blood (viral load) of the treated study participants in group one.
In the second group (the deferred group), the HIV-infected partners began antiretroviral therapy when their CD4+ T-cell levels—a key measure of immune system health—fell below 250 cells per cubic millimeter or an AIDS-related event occurred. The HIV-infected participants also were counseled on the need to strictly adhere to the treatment regimen.

The study was slated to end in 2015, but an interim data review in May by an independent data and safety monitoring board (DSMB) found that of the total 28 cases of HIV infection among the previously uninfected partners, only one case occurred among those couples where the HIV-infected partner began immediate antiretroviral therapy. The DSMB, therefore, called for immediate public release of the study's findings.

The magnitude of protection against HIV infection demonstrated in HPTN 052 has made the successful strategy of the clinical trial a key component of public health policies recently discussed by federal officials and others saying that achieving an end to the HIV/AIDS pandemic is now feasible with additional research and implementation efforts.

"On its own, treatment as prevention is not going to solve the global HIV/AIDS problem," said Dr. Fauci. "Yet when used in combination with other HIV prevention methods—such as knowing one's HIV status through routine testing, proper and consistent condom use, behavioral modification, needle and syringe exchange programs for injection drug users, voluntary, medically supervised adult male circumcision, preventing mother-to-child transmission, and, under some circumstances, antiretroviral use among HIV-negative individuals—we now have a remarkable collection of public health tools that can make a significant impact on the HIV/AIDS pandemic."

"Scale-up of these proven prevention methods combined with continued research toward a preventive HIV vaccine and female-controlled HIV prevention tools places us on a path to achieving something previously unimaginable: an AIDS-free generation," Dr. Fauci added.

HPTN 052 was conducted by the HIV Prevention Trials Network, which is largely funded by NIAID with additional funding from the National Institute on Drug Abuse and the National Institute of Mental Health, both part of the NIH.

For additional information about the HPTN 052 study, see the Questions and Answers (http://www.niaid.nih.gov/news/FAQ/Pages/HPTN052qa.aspx). Visit the NIAID HIV/AIDS Web portal (http://www.niaid.nih.gov/topics/HIVAIDS/Pages/default.aspx) for more information about NIAID's HIV/AIDS research.

Journal References:

Religious leaders battle African homophobia
Facing bombs and bigotry, a growing band of clergics stands up for gay rights
By Naomi Abraham
When Secretary of State Hilary Clinton made a historic speech in Geneva on Dec. 8 calling for recognition of gay rights and support for those who brave hostility to defend gay rights, she might have been speaking of the Rev. MacDonald Semberka who was in the audience listening.

On the evening of Sept. 11, 2011, Semberka, a Malawian Episcopalian, found his house reduced to recognizable rubble by a petrol bomb. A month later, he borrowed money for airfare so he could attend a conference at Union Theological Seminary, a Manhattan institution with a long history of social activism. He arrived wearing a clerical collar and a smile that belied the horror of seeing his home and nearly everything his family owned destroyed. At the two-day conference in New York, he would meet and strategize with other Christian leaders in the fight against Africa's perilous and increasingly prevalent brand of homophobia.

Semberka is one of a small but growing group of African religious leaders who have taken great personal and professional hits for supporting LGBT rights. For their efforts, they have faced violence, professional alienation and social ostracization. Yet these straight men and women, primarily Christian clergy, continue to criticize the intensifying vitriol and violence against gay Africans.

The motivation behind the bombing of the house Semberka shared with his wife, two children and extended family has yet to be determined, and the perpetrators may never be brought to justice. But
Malawian human rights organizations say Sembereka was likely a target because of his outspoken pro-gay views and his valiant defense of human rights.

Fortunately, the only ones home that fateful night were two teenage boys who managed to run out unharmed. “I’m thankful that miraculously no one was hurt,” Sembereka told me in an interview. “But what hurts me the most is to see my [7-year-old] daughter traumatized. She’s had bad nightmares since the attack.”

For the most part, African faith leaders have either fanned the flames of homophobia or stayed quiet on the issue. In some cases, they have been the key agitators of anti-gay attitudes in their countries.

In an interview last summer, Bishop Benjamin Nzimbi, the former archbishop of Kenya, told me that he could fix homosexuals by marrying off lesbians with gay men. Ugandan evangelical pastor Martin Ssempa has shown same-sex pornography to his congregation of hundreds in Kampala in order to rally up support for the Ugandan government’s anti-gay position.

Last month, after British Prime Minister David Cameron threatened to cut aid to Ghana unless it retracted its anti-gay policies, religious leaders there made sharp comments against homosexuality and warned against capitulation. Some of the criticism came from 53 LGBT African groups who wrote, “While the intention may well be to protect the rights of LGBTI people on the continent, the decision to cut aid disregards the role of the LGBTI and broader social justice movement on the continent and creates the real risk of a serious backlash.”

Last week, after Clinton announced a similar decision to tie U.S. foreign aid to a country’s record on gay rights, the backlash was evident. Yoweri Museveni, Uganda’s president, said of homosexuality, “It’s something anathema to Africans, and I can say that it is abhorrent in every country on the continent that I can think of.” The National Council of Churches in Kenya stated flatly, “We don’t believe in advancing the rights of gays.”

Where religion plays a significant role in the lives of many Africans, faith leaders yield great influence over politics and in setting the moral compass of most African societies. Last spring when Kenyan President Mwai Kibaki nominated Willy Mutunga, a pro-gay judge, many of the country’s religious leaders sprang into action to oppose his nomination. Making matters worse for them, Nancy Baraza, the president’s choice for the deputy chief justice, was also supportive of gay rights. For two months, substantive issues were sidelined for questions on the nominees’ sexuality.

The two nominees, both straight, were eventually confirmed as chief and deputy chief justice. Activists in Kenya and across Africa hailed this as an unparalleled victory in their struggle for equality. Longtime gay rights activist David Kuria said, “Things are changing and the most pertinent example is the nomination of the deputy and chief justice. This discredits that Africa is universally united in its opposition of homosexuals.”

Methodist Rev. John Makokah of Kenya, who’s been blasted for his pro-gay views, said, “We have a long way to go but Willy Mutunga and Nancy Baraza will help usher a new dawn for persecuted homosexuals.” But the hearings in the Kenyan parliament last summer also demonstrated the strong sway of religion on government decisions.

Generally, media reports on homosexuality in Africa have focused on the legislative push in Uganda to render certain acts of homosexuality a crime punishable by death and on the wave of lesbian “corrective” rapes in South Africa. But little attention has been given to the African activists, gay and straight, who challenge the mistreatment of gay Africans and the criminalization of homosexuality in 38 of 54 countries in Africa.

For example, Bishop Christopher Senonjo, a retired 80-year-old Anglican Bishop from Uganda, has been a beacon of support for LGBT Ugandans since 1998 when he began to counsel gay men and women. Around the same time, a group of gay men founded one of Uganda’s first gay groups and asked the bishop to chair the organization. His decision to accept the invitation would lead to years of persecution. Because of his support of homosexuals, he would be ostracized from the church, stripped of his pension and precluded from performing his religious duties.

But he says the most difficult part of his ordeal has been the backlash against his family. Recently, his daughter’s fiancé broke off the engagement because he said he didn’t want to be associated with a family who held pro-gay views. But early on, he says, even his family had their doubts. His wife, Mary, 73, did not understand or agree with what he was doing but, laughing and showing his toothy smile, he said, “God changed her heart.”

Today, Mary is a quiet force of support for her husband and the LGBT individuals she meets through his work. When a Ugandan lesbian broke down into uncontrollable tears at the conference in New York,
Mary scooted her chair to where the woman was sitting and rubbed her back till she stopped sobbing and stayed by her side for the rest of the day.

Albert Ogle, president of St. Paul’s Foundation for International Reconciliation, a faith-based organization headquartered in San Diego, says that the Senonjo and Sembereka “are fueled by a moral value, which is about including all the marginalized in ministry and service. It’s not that their mission is about gay rights necessarily but to serve all humanity.”

By the end of the conference Ogle and those in attendance formed a coalition, which they dubbed “Compass to Coalition” to combat punitive laws and attitudes toward LGBT people in Africa and in the 76 countries around the world where it is illegal to be gay.

Anglican priest Michael Kimindu of Kenya says religious leaders in Africa have to be at the helm for changing attitudes toward gay people. Like many of his counterparts, he’s also been banished from the church and alienated from family members for his work with LGBT Kenyans. “We can’t let them be treated this way,” he says of gay Kenyans. “The church has to lead in bringing dignity to these people.”

When Sembereka took the stage at the conference, he also spoke of the formidable challenges that he and other LGBT-affirming faith leaders faced: “We are branded as Western puppets or gay ourselves.” He added that these attacks would not stop him or his colleagues from continuing to fight the unnecessary persecution of people of diverse sexualities. Later when asked about his destroyed home he said, “That too will be something of the past just like the plague of homophobia.”

Mozambique to produce its own antiretroviral drugs
Mozambique is to become the first country in Africa to produce its own antiretroviral drugs to slow down the HIV virus that causes Aids.
By Aislinn Laing, Johannesburg
3:08PM GMT 28 Dec 2011
Alexandre Manguele, the southeastern country’s health minister, announced that the first ARVs produced in Mozambique, in partnership with Brazil, will be ready by July 2012.

In doing so, it will be the first African country – rather than private sector supplier – to produce its own stocks of the drug, which can prolong the lives of HIV sufferers by decades.

For the past ten years, a handful of mainly First World drug multinationals have battled to keep in place patents allowing them to control the lucrative market.

Although most African countries aim to provide free ARVs to their citizens, the high costs of importing them, coupled with a recent cut in funding from international foundations, means that many are struggling.

A total of 10.6m people in sub-Saharan Africa are in need of ARV treatment but only 37 per cent currently have it. In Mozambique, 15 per cent of people aged 15 to 49 have HIV.

Brazil has been producing its own ARVs since 1993 and now provides free, generic versions of the drugs to everyone in the country suffering from HIV.

Mozambique is the biggest beneficiary of aid from Brazil, which has invested heavily in its infrastructure, mining, health, agriculture and educational sectors.

Mr Manguele told the capital Maputo’s daily newspaper Noticias that he had signed a deal to co-produce ARVs in a factory in the southern city of Matola with Brazilian ambassador Antonia Silva.

Brazil will provide training for Mozambican staff in the production, management and quality control of the drugs, as well as technical oversight.

"We are pleased because more people will have access to the antiretrovirals produced in Matola”, Mr Manguele added.

Marcus Low, of South Africa’s Treatment Action Campaign, said Kenya was also taking steps to produce its own drugs.

"New international agreements on intellectual property are going to make drugs more expensive and that’s why countries are now trying to produce them themselves,” he said. "This is a proactive move for Mozambique.”

"Tail" Regimens Reduce HIV Resistance After Intrapartum Nevirapine
NEW YORK (Reuters Health) Dec 27 – A single intrapartum dose of nevirapine to prevent HIV transmission to the baby can lead to nevirapine resistance in the mother, but short-term antiretroviral "tail" regimens will substantially cut the risk of that problem, a study from Thailand shows.
"The finding that a short tail of highly active antiretroviral therapy was as effective as a longer tail suggests that early suppression of viral replication prevents the selection of resistant virus for the full duration of NVP exposure," the authors pointed out in a paper released online December 5th in Clinical Infectious Diseases.

The result wasn't exactly what they expected, however.

Dr. Russell B. Van Dyke, at Tulane University Health Sciences Center in New Orleans, Louisiana, and colleagues explain that a one-week postpartum "tail" of lamivudine and zidovudine after single-dose nevirapine has been shown to reduce the risk that nevirapine-resistant virus will emerge. Other tail regimens are also effective.

The team hypothesized that a longer or more potent tail regimen might reduce the incidence of NVP resistance further. To test that, they recruited 139 HIV-infected pregnant Thai women. The women received a 200-mg dose of NVP at onset of labor and were then randomized to one of three regimens: zidovudine, didanosine, and lopinavir plus ritonavir (i.e., HAART) during labor and for seven days postpartum; zidovudine and didanosine (i.e., dual reverse-transcriptase inhibitors) during labor and for 30 days postpartum; or the HAART regimen for 30 days postpartum.

When measured by the sensitive oligonucleotide ligation assay (OLA), the incidence of new NVP resistance mutations up to six weeks postpartum in the three groups was 1.8%, 7.1%, and 5.3%, respectively, the investigators found. That compares to an incidence of 29.4% in a similar historical control group.

No resistance mutations were detectable by consensus sequencing, indicating that the resistance mutations detected by OLA were present in low frequency and likely to decay rapidly after NVP clearance, Dr. Van Dyke and colleagues comment.

Weighing the pros and cons of the tail regimens tested in this trial, they conclude: "In choosing among these options, seven days of highly active antiretroviral therapy has the advantage of a short duration of therapy, but the cost, potential for intolerance, and limited availability of lopinavir and ritonavir in some locations may be a disadvantage. On the other hand, 30 days of dual reverse-transcriptase inhibitor therapy has the advantage of simplicity and low cost, but the longer duration of therapy has the potential for poorer adherence."


**Vancouver Crack Addicts Given Free Pipes in Bid to Curb Disease**

*Edmonton Journal*, (12.31.2011) – Cassidy Olivier, Postmedia News

In December, Vancouver began an eight-month trial project to improve the health of crack cocaine smokers in the troubled Downtown Eastside neighborhood. The use of crack has surged locally, said Trudi Beutel, a spokesperson for Vancouver Coastal Health Authority (VCHA).

VCHA aims to distribute 60,000 harm-reduction kits through five distribution centers as part of the broader, $60,000 (US $59,429) trial. The project seeks to quantify the number of crack smokers in Vancouver, to learn more about crack addiction, and to engage users and offer services including detoxification, Beutel said.

The kits contain glass pipes that are heat-resistant and shatterproof: Experts say this should reduce mouth injuries that can make smokers more susceptible to diseases, including HIV and hepatitis B and C. In addition, the kits contain mouthpieces, filters, alcohol swabs, screens, and push sticks. These items have been offered in the past separately; this is the first time they have been combined in a single kit, Beutel said.

"What this boils down to is it's about disease prevention," Beutel said. "It's about preventing more communicable diseases, which land these people in hospital on a frequent basis and clog up emergency rooms."

The five distribution centers—Washington Needle Depot, Vancouver Area Network of Drug Users (VANDU), Portland Hotel Society, Lookout Shelter, and Drug and Alcohol Meeting Support for Women—have agreed to report data throughout the trial.

**Young Women's Use of Reproductive Health Services Declines**


A new study shows a decline in reproductive health care use among US females ages 15-24 in recent years.

The researchers, led by Kelli Stidham Hall of Princeton University's Office of Population Research, examined data on 4,421 young female participants in the National Survey of Family Growth. The team
found an 8 percent drop in the women’s reports of Pap tests, screenings for STDs and pregnancy, and other OB-GYN services from 2002 to 2006-08. By comparison, reproductive health care use among young women increased between 1995 and 2002, the team noted.

While declines were seen among all demographic and socioeconomic groups, economically disadvantaged women were the least likely to have received care. Factors that may have contributed to the downturn in use include: a reduction in public-sector clinics serving low-income women; increasing unemployment and decreasing rates of health insurance coverage; changes to screening guidelines that call for fewer Pap tests; and legislation that has increased mandatory parental participation in adolescent sexual and reproductive health care.

“Our findings may be a reflection of changing social, economic, and political contexts in which reproductive services were needed and provided over the last decade,” wrote the team.


Sex Parties Among Young Gay, Bisexual and Other Men Who Have Sex with Men in New York City: Attendance and Behavior
_Journal of Urban Health Vol. 75; No. 6: P. 1063-1075_, (12..2011) — Todd M. Solomon; and others

Little is known about sex party behaviors in young men who have sex with men, often defined as the 13- to 29-year-age-range. “The current analysis examines sex party attendance and behavior in a sample of 540 emergent adult gay, bisexual, and other YMSM in New York City, ages 18-29 years,” the authors wrote.

Among respondents, 47 YMSM (8.7 percent) had attended a sex party three months prior to assessment. Attendees reported that parties included both HIV-positive and –negative men; they also reported unprotected sex and limited access to condoms and lubricant.

Compared with those who did not attend sex parties, those who did reported significantly more lifetime and recent (last three months) casual sex partners, drug use (both in number of different drugs used and total lifetime use), psychosocial burden (history of partner violence and number of arrests), and total syndemic burden (a composite of unprotected anal sex, drug use, and psychosocial burden).

“These results indicate that while only a small percentage of the overall sample attended sex parties, the intersection of both individual risk factors coupled with risk factors engendered within the sex party environment itself has the potential to be a catalyst in the proliferation of the HIV/AIDS epidemic in urban settings,” concluded the authors.

“Lastly, given that sex parties are different than other sex environments, commercial and public, with regard to how they are accessed, public health strategies may need to become more tailored in order to reach this potentially highly risky group.”

Electrocautery Prevents Progression to Anal Cancer in HIV Positive and Negative Gay Men
Published on Wednesday, 31 December 1969 16:33
Written by Liz Highleyman
HPV © Russell Kightley

Electrocautery ablation to remove abnormal tissue significantly reduced the likelihood of progression to anal cancer for both HIV positive and HIV negative gay men with high-grade anal intraepithelial neoplasia, according to a study described in the November 30, 2011, advance online edition of the _Journal of Acquired Immune Deficiency Syndromes_.

As antiretroviral therapy (ART) has extended survival and reduced the rate of AIDS-defining illnesses, anal cancer has become a growing concern for people with HIV, especially men who have sex with men.

HIV positive people are more likely than their HIV negative counterparts to carry high-risk or oncogenic (cancer-causing) types of human papillomavirus (HPV), including types 16 and 18. HPV can cause abnormal cell changes in the anal-genital region known as dysplasia, intraepithelial neoplasia, or squamous intraepithelial lesions. Intraepithelial neoplasia is graded as low, moderate, or high (corresponding to stages 1, 2, and 3), and can progress to anal or cervical squamous cell carcinoma, a form of cancer.

Women routinely receive Pap tests to screen for cervical cancer and experts increasingly recommend that gay and bisexual men should undergo similar screening for anal cancer. A variety of treatments are
used to prevent anal intraepithelial neoplasia (AIN) from progressing to cancer including topical chemotherapy and techniques to remove abnormal tissue. Douglas Marks and Stephen Goldstone from Mount Sinai School of Medicine conducted a retrospective analysis of electrocautery, or burning with an electrical current, to ablate or remove high-grade anal neoplasia. The procedure was done in the clinician's office and did not require anesthesia or sedation.

The study authors looked at medical records from a New York City surgical practice, identifying patients with high-grade AIN who were treated with electrocautery ablation between 2006 and 2010. They were followed for at least 5 months with high-resolution anoscopy (examination of the anus with a microscope), biopsy, and/or cytology (examination of cells in the laboratory). They determined the likelihood of high-grade AIN recurrence and progression to anal carcinoma after the procedure.

The analysis included 232 men who have sex with men, 132 of them HIV positive and 100 HIV negative. The median ages for the 2 groups were 42 and 49 years, respectively. Median follow-up durations were 19.0 and 17.5 months, respectively.

**Results**

- The first electrocautery procedure cured high-grade AIN lesions in 75% of HIV positive men and 85% of HIV negative men.
- During follow-up, 61% of HIV positive men and 53% of HIV negative experienced AIN recurrence.
- Mean numbers of recurrent lesions were 1.9 and 1.6, respectively.
- HIV positive men were 1.28 times more likely than HIV negative men to experience AIN recurrence after the first electrocautery procedure, not a significant difference.
- HIV positive men were 2.34 times more likely to experience recurrence after a second electrocautery attempt, which was significant (P = 0.009).
- A majority of recurrences were additional AIN lesions at untreated sites (known as metachronous recurrence), rather than recurrence at the same site.
- HIV positive patients with fewer high-grade AIN lesions at initial presentation had a lower recurrence rate than men with multiple lesions; men with 1 lesion were 55% less likely to experience recurrence than those with 2 lesions, and 73% less likely than those with 3 lesions.
- At the last visit, 69% of HIV positive men and 83% of HIV negative men were free of high-grade AIN.
- 1 HIV positive patient developed anal carcinoma (0.4%).
- The most common side effect was post-treatment pain, which was manageable with over-the-counter medication.

Based on these findings, the researchers concluded, "Electrocautery ablation is an effective treatment for high-grade AIN, with fewer patients progressing to anal squamous cell carcinoma than predicted with expectant management."

In both HIV positive and HIV negative patients, lesions that were not cured with the initial electrocautery procedure were less likely to be successfully ablated with subsequent treatment, they elaborated in their discussion.

"This observation has both positive and negative implications," they wrote. "[T]here does not appear to be any lasting tissue effect following electrocautery ablation such as scarring or destruction of the transformation zone that could diminish recurrence. Development of persistent lesions may be due to inadequate initial ablation, or cancer-causing HPV in adjacent cells could be activated during wound healing and cause new AIN lesions to develop.

"Despite the fact that patients required multiple treatments to ablate high-grade AIN and recurrence remained high, morbidity was minimal," the authors wrote. "The mean time to recurrence in both groups approached a year. Moreover, the mean number of recurrent lesions did not exceed 2 so repeat ablations were localized and not extensive. This could translate into less pain with more rapid healing."

They also noted that cure rates for electrocautery ablation were similar to those seen for another ablation method, infrared coagulation (72% for HIV positive and 81% for HIV negative patients in 1 study). Topical treatment with imiquimod (Aldara) or tricholoracetic acid also produced cure rates in the 60%-70% range in previous studies, though these were not directly comparable.

The authors acknowledged that some clinicians advocate a more conservative approach of closely monitoring high-grade AIN and only treating if early cancer develops, since many patients with high-grade AIN never progress to cancer and those who do would be caught early, but studies have shown that
people with early anal cancer often require radiation or more drastic surgery—outcomes associated with "significant morbidity and decreased quality of life."

"Treatment of high-grade AIN aims to reduce incidence of anal cancer and requirements for large surgical resection or radiation and chemotherapy," they continued. Treatment resulted in a 0%-1.2% rate of progression to anal cancer—far lower than retrospective studies which showed 8.5% to 13% progression without intervention.

"Electrocautery ablation of high-grade AIN is a safe and effective office-based procedure comparable to other available treatments," the researchers summarized. "Cure rates of individual lesions are excellent but patients continue to develop metachronous recurrence making continued follow-up important. While we documented a single progression to anal squamous cell carcinoma (0.4%), rates are far lower than series advocating a 'watch and wait' approach." – 1/3/12

Reference