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SPOTLIGHT

Ethical Conduct in Research

BY DR SANJAY MEHENDALE AND SEEMA SAHAY

Dr Sanjay Mehendale, *Senior Grade Deputy Director at National AIDS Research Institute (NARI), Pune and Principal Investigator of the recently-commenced Phase I clinical trial of the AIDS vaccine* and Seema Sahay, *Senior Research Officer at NARI* draw on their experience to throw light on ethical concerns involved in conducting AIDS vaccine trials in developing countries.

The social, political and developmental crises caused by the AIDS epidemic in some developing countries in Asia and Africa have spurred endeavours for the development of AIDS vaccines. With India having launched its first Phase I human clinical trial for a preventive AIDS vaccine, certain issues have come into the forefront that can no longer be ignored, primary among them being the question of ethics.

There will always be questions about the ability of people in the developing countries, particularly illiterate and less literate people to make informed decisions to participate in vaccine trials, the use of vulnerable populations, the quality of the regulatory infrastructure, safety monitoring mechanisms and transparency. It is therefore important that the government, researchers,

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IN FOCUS

Eradicating HIV with Valproic Acid

Novel Treatment Method Raises Hopes, Doubts

A recent proof-of-concept study, published in the August 13, 2005 issue of *The Lancet* by Ginger Lehrman of the University of Texas, Southwestern Medical Center at Dallas and her collaborators from other universities in the US, has raised hopes of treating HIV infections by reducing the pool of dormant HIV-infected cells in the body. This pilot study found that valproic acid (VPA or Depakote) - commonly used to treat bipolar disorders and epilepsy - and the antiretroviral drug enfuvirtide, when added to the anti-HIV regimens of four patients, was able to eliminate the virus from latently infected CD4+ T cell.

The study concludes that HDAC inhibitors, such as VPA, could lead to HIV eradication when combined with other anti-HIV drugs. "Our findings show that 16 to 18 weeks' treatment with a standard clinical dose of VPA, in the setting of intensified highly-active antiretroviral therapy, produces a substantial decline in the frequency of replication-competent HIV in circulating resting CD4+ T cells," say the researchers.

How Valproic Acid May Work

The HIV virus introduces its genetic material into the DNA of the human CD4+ T

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sponsors and the community have a clear understanding of how various ethical issues related to the HIV vaccine trial are addressed in clinical trials.

What is Ethical Practice?

Ethical practice requires that researchers should ensure the safety and welfare of participants and their rights. Ethical concerns in AIDS vaccine trials are related not only to the nature of the virus, but also to the social stigma attached to the disease. They involve physiological and psychosocial risks to trial participants, issues relating to informed consent, complex trial design, and access to an effective vaccine and care in the post-trial phase.

While there exist international guidelines for ethical conduct of clinical trials, ethical review has to be done in the country hosting the trial. In India, the Indian Council of Medical Research (ICMR) has published a set of guidelines for biomedical research on human subjects that are on par with international norms. Therefore, local ethics committees (ECs) must examine the safety and protection of vulnerable human participants, value of the research, appropriateness of the methods, balance of the risks and benefits and arrangements for taking voluntary, informed consent from participants. They must ensure that research is not restricted to specific populations, is inclusive of future beneficiaries and that local regulations are followed.

In short, as laid down by the Council for International Organizations of Medical Sciences (CIOMS), ethical standards governing human subject research must be no less stringent in developing nations than in developed ones. This can be difficult if the levels of literacy are lower, understanding about the nature and causation of diseases is sub-opti-

mal and personal identity and individuality are not considered important.

Ethics and Potential Participants

At the outset, potential participants should be clear that they are being asked to participate in a research study to test a vaccine against AIDS. Comprehension tests can assess the level and depth of understanding of the potential participants. Additionally, volunteers must also understand that they have the right to refuse to participate or withdraw at any time without losing any benefit at the trial site.

It is also of primary importance that potential participants are aware that the vaccine being tested is an experimental product with no proven safety and efficacy in humans. Participants should also be aware that in a placebo-controlled trial, they may receive a placebo and in a blinded trial, they will not be aware of what they receive. However, there is an overall agreement that trial participants who received a placebo in the clinical trial of a vaccine should be offered the vaccine once it is licensed.

Potential participants should be aware that they may experience some expected and/or unexpected side-effects of the experimental vaccine. They must be told about the kind of care that would be provided to them during and after the trial and the steps that would be taken to maintain confidentiality.

It is also universally accepted that the subjects are reimbursed for expenses

incurred and the inconvenience caused to them in connection with the research. However, payments cannot be so large or medical services so extensive that prospective subjects consent to participate against their better judgment and wishes.

International ethical guidelines also require that participants be compensated for research-related injuries and be informed about the circumstances in which they or their dependants would (or would not) receive it. Further, provisions for survivors in case of uncommon events such as a participant's death (likely to be a rare event in a vaccine trial) need to be delineated in the trial documents.

Ethics and Standards of Treatment

Potential participants and researchers often face ethical questions such as: When the intervention being tested is a vaccine and not a therapy, are sponsors or investigators ethically obliged to provide treatment?

Though trial participants will be counselled to engage in safer sexual practices, initial test vaccines are not likely to be 100 percent effective. There will be predictable and unavoidable instances of HIV infection among vaccine recipients [especially in Phase III trials] amongst those who practise risk behaviour despite counselling. There are different views on the researchers' responsibility to provide treatment in such situations. These range from providing the 'best proven treatment' to

Only good scientific research is ethical (because some risk may be justified); and only ethical research (based on important and objective questions) is good science.

Bill Snow

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the 'prevailing standard of care available in the host country'. Antiretroviral drugs are expensive; their availability is limited and need to be taken life long.

In many developing countries, the prevailing standard of care may not be equivalent to care available in developed countries. That leads to the next question: If ethics demand that treatment be given to individuals infected with HIV in vaccine trials, should trials be conducted in developing countries if the cost of therapy is prohibitive? Will a decision to provide the best available therapy constitute unreasonable inducement? If antiretroviral therapy (ART) is initiated, should the commitment be for the duration of the trial or for life? There are no definitive answers.

Developing countries hosting a vaccine trial should have a clear policy on the provision of insurance and ART for a stipulated period. They should negotiate the required arrangements with the trial sponsors and share some responsibility as well. If researchers and sponsors cannot make adequate commitment for treatment and care, this should be clearly explained in the consent form.

There is also a general agreement that any vaccine that has proved effective must be made available in the trial countries at an affordable cost. However, two questions arise: How can accessibility be ensured and how broadly can the product be made available? Should access be limited to those at risk of acquiring the infection or be extended to the general population? Even before initiating the trial, the host countries should review their economic and political mechanisms, and their infrastructural abilities to determine if they can ensure such access in future for the masses.

Ethical Challenges in India

Sustained advocacy at the socio-political level is needed to prioritise resources for development and testing of the AIDS vaccine in India. In a traditional society with overall low levels of awareness, the trial will be influenced by stigma, illiteracy and gender norms. For example, it has been stressed by some Community Advisory Boards that the involvement and concurrence of men would be needed for married women to participate.

In India, trials involving investigational products come under the regulatory purview of the Office of the Drugs Controller General of India. Along with the ICMR and ECs, such bodies should ensure that study information documents and consent forms are appropriately designed with in-built

mechanisms for the research team to verify comprehension by the research subjects. The study materials should be simple, adequately explanatory and informative.

Lengthy written documents such as consent forms and disclosure statements detailing the research, risks, benefits and procedures require signatures and may be viewed with suspicion. While signing informed consents signifies protection of individual autonomy, it also makes assumptions about people's legal status, literacy and capacity to comprehend medical information. Therefore, it may be necessary to develop pictorial or audio-visual consents to facilitate informed consent process.

Given the stigma attached to AIDS, trial participants may be considered at 'high risk' of disease acquisition and thus face

Care and Treatment Guidelines for the NACO-ICMR-IAVI AIDS Vaccine Trials

In March 2004, a national consultation was held in New Delhi to clarify the responsibilities of research sponsors (IAVI) and the host country (India) in providing care and treatment for trial participants. The recommendations of the consultation were accepted by the government. These have been incorporated into the informed consent documents for the Phase I trial with the candidate vaccine tgAAC09 ongoing at National AIDS Research Institute, Pune. The care and treatment guidelines based on the recommendations broadly include:

Any medical costs and indemnities caused to the volunteer that might result from some degree of invalidity and related to vaccine tested are covered entirely by the trial sponsor. Should the volunteer become HIV-infected during the course of the trial, the study sponsor will support access to care, support and treatment, including free-of-cost anti-retroviral therapy (ART) for a period of five years from the point of eligibility as and when medically recommended by existing national treatment guidelines. The Government of India has committed to provide treatment beyond this covered period. The volunteer will also be provided medical insurance for vaccine-unrelated medical events (not covering HIV infection and vaccine-related events) for the duration of the trial period. Other medical conditions that are not vaccine-related are covered by a medical insurance offered to the volunteer for the duration of the clinical trial. Social harm such as stigma and discrimination resulting from the participation in an AIDS vaccine clinical trial is also addressed through iterative counselling sessions with the volunteer.

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discrimination. Researchers should ensure that participants are protected from such harm. Participants will therefore need sustained risk-reduction counselling and sensitive monitoring which is an ethical requirement.

A major challenge, if the vaccine proves effective, is to set up mechanisms to ensure a sustained supply to the population. Fortunately, India has the expertise and the biotechnological and pharmaceutical infrastructure to make this happen with the support of

the trial sponsors. It is necessary to establish a national HIV vaccine policy. This should outline a vaccine development plan, an operational plan and an action plan to steer the country from Phase I to Phase III of the clinical trials and beyond. ■

IN CONVERSATION

“India can create both the demand as well as the supply of new vaccines”

An Interview with Dr Brent Burkholder



Dr Brent Burkholder

As the Regional Advisor for Immunization and Vaccine Development (IVD) for the WHO Southeast Regional Office (SEARO), Dr Brent Burkholder is responsible for providing overall technical direction to 11 WHO member countries in all aspects of immunisation, including implementation of the polio eradication programme, ensuring vaccine quality standards and assisting with the introduction of new vaccines in regular EPI activities. On secondment from the US Centers for Disease Control (CDC), where he worked on hepatitis programmes, Dr Burkholder served as Chief of the International Emergency and Refugee Health Program for CDC for seven years in several countries including Somalia, Rwanda, Zaire, Bosnia, Pakistan and Bangladesh. Sankalp recently interviewed him about the challenges in research and development of new vaccines in India.

What are the vaccine R&D priority needs and challenges in the region?

There are four broad categories of priority vaccine R&D initiatives in the South-East Asia Region (SEAR). The first is to strengthen capacity of the National Regulatory Authorities (NRA) and National Control Laboratories (NCL) of each country to ensure quality of new vaccines and delivery technologies. This is especially important for those countries that produce their own vaccines such as India, Indonesia, and to a lesser extent Thailand. These regulatory bodies must develop the capacity to conduct quality checks for new vaccines such as combination vaccines as well as for vaccines incorporating new technologies, such as conjugate or chimeric vaccines.

Secondly, it is important to strengthen capacity of existing clinical trial sites and develop new ones to meet future de-

mand. Western countries now require that producers testing new vaccines developed for use in developing countries must conduct clinical trials in the countries of final use. This is especially true in India, Indonesia and Thailand, but also for other countries where clinical trials take place routinely such as Bangladesh. Investment in development of vaccines especially needed in SEAR must be increased. Western companies tend to focus on development of new vaccines targeted to higher profit markets of the US, Europe or Japan. However, there is an urgent need to develop vaccines such as dengue, Japanese encephalitis, rota virus, etc., to address diseases prevalent in SEAR.

Lastly there must be increased surveillance and disease burden data for diseases which have the potential to be prevented by vaccines. Understandably, investment in new vac-

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cines will not be forthcoming unless the need and demand can be demonstrated. More effort is needed to develop comprehensive, standardised surveillance through both sentinel sites as well as routine surveillance in order to better define the true disease burden in the region.

How can India best contribute towards these challenges?

With over 20 key vaccine producers and a huge population, India is at the forefront of all of the above initiatives. The Indian National Technical Advisory Group on Immunisation (NTAGI) along with the Vaccine Production Board play a critical role in determining the national priorities for vaccine development in the country. As the largest country in the region, India can create both the demand as well as the supply of new vaccines which could be beneficial for multiple countries in SEAR. While NTAGI has provided technical guidance, the national government still needs to develop a comprehensive vaccine policy which outlines both the production priorities for the country as well as the optimum interaction between private and public producers.

What have been the developments in the production and use of new vaccines in India during your tenure?

Over the last five years, there has been major progress made both in terms of R&D as well as actual production of new vaccines. The Hepatitis B vaccine has been available globally for many years but was not widely available or utilised in India. The Ministry of Health and Family Welfare has introduced this vaccine into the national Extended Programme for Immunisation (EPI) in a phased manner since 2003. Several national manufacturers now produce Hepatitis B and should have sufficient quantities for both domestic and international use.

Although not yet introduced in the country, DTP-Hepatitis B combination vaccine is now also licensed in India and under production. This technology is now widely utilised in India and several manufacturers are also in the process of producing other combination vaccines which should be in the market shortly. Other new technologies include the development of a conjugate Meningitis A vaccine under a joint venture with a European manufacturer. Many other vaccines, such as tissue culture Japanese encephalitis, are in the early stages of development. Other vaccines, such as rota virus and HIV are already undergoing clinical trials. All of these efforts demonstrate that over the last few years, Indian manufacturers have played a prominent role in developing and testing new vaccines that will potentially have a major health impact in the country as well as globally.

What have been the challenges in expanding the current portfolio of vaccines and introducing new ones in the National Immunisation Programme?

The key challenges I spoke about for the region also apply to India. Of course, factors such as the size of the country, the prevalence of vaccine-preventable diseases, the diversity of health systems and the cost of introducing new vaccines make the challenges in India even more dramatic. As I mentioned earlier, the country could benefit from a national plan which prioritises vaccines likely to have the most public health benefit over the next ten years. To do this, policy makers can draw upon the new Integrated Disease Surveillance Project for surveillance data on disease burden. Additional financial resources will be required for India to develop the technical knowledge necessary for new vaccine development.

Could you elaborate on the key lessons learnt for effective introduction of new vaccines in the country?

The introduction of Hepatitis B vaccine in parts of the country over the last two years has been instructive. Any major change in the national EPI system such as introducing a new vaccine requires extensive planning on multiple fronts. The first critical step in the success of this effort is consolidating the support of the key partners, including the private medical sector (e.g. Indian Academy of Pediatrics and Indian Medical Association), state and local health officials, health NGOs, etc. Adequate and timely training of the health workers at the delivery level is essential to ensure that the new vaccine is accepted and administered safely and appropriately. Extensive logistical planning is essential so that there is adequate cold chain capacity, syringe storage, vaccine distribution and the multitude of other details required for effective vaccine management. Underlying all of these planning arrangements is the availability of sustainable funding to ensure that the programme continues at a quality level.

Given India's strengths as a global player in vaccine production and a skilled workforce with strong innovation capacity, what are the critical measures that India must take to build vaccine security within the country?

Based on inputs from NTAGI and others, India must develop a clear national vaccine policy which lays out priorities, responsibilities and vision for vaccine production and procurement. It must also strengthen NRA and NCL capacity for quality control and maintain a proactive public-health sensitive approach to intellectual property and trade agreements in order to foster vaccine R&D. The financial and technical resources available for vaccine R&D in the country must also be strengthened. Finally, coordination and collaboration among public and private manufacturers, government health officials and research institutions must be ensured. ■

EVENTS UPDATE

AIDS Vaccines and the Global Forum for Health Research, Mumbai Helping Correct the 10|90 Gap

BY ROBERT HECHT

The Global Forum for Health Research, held in Mumbai between September 13 and 16, was certainly one of the best attended and most stimulating of the annual meetings that the Global Forum secretariat has organised over the past nine years since it was established.

I have attended previous Forums in Tanzania, Geneva, and Mexico City and found the level of participation, the quality of the presentations and exchanges, and the value of the event this year in Mumbai to be the highest ever.

What made this Forum so successful, in my opinion, was the combination of excellent organisation of the event by the Indian Medical Research Council; a structured agenda with well-prepared presentations by top international health researchers; and a high level of commitment to health research expressed at the meeting by the Indian government.

It was highly gratifying for the more than 1,000 participants at the Forum that the President of India, APJ Abdul Kalam, came to the inauguration and spoke eloquently about the importance of health research and technology for India's future, and about the resolve of the Indian government to see that India is on the cutting edge of health research.

Of course, all of us in IAVI were delighted to hear the President refer to the development of an AIDS vaccine as his number one priority – something that would have a huge, transformative effect on health in India and many other parts of the world.

This made it easy for me to return to the theme of an AIDS vaccine in my

plenary session the next morning on September 13. I spoke about how urgently we need new health tools – including an AIDS vaccine but also new drugs for malaria, better diagnostics for tuberculosis, etc. – in order to achieve and sustain progress on the Millennium Development Goals (MDGs). An AIDS vaccine would help to end the epidemic, and thereby also be a tremendous force in fighting global poverty. A vaccine would be highly cost effective and could also reach hundreds of millions of people including women –

The Forum highlighted the critical future role of India and other innovatively developing countries in creating new health technologies. It facilitated the exchange of new information on biomedical progress and on the growing area of research on health delivery systems.

in this sense, it had the potential to be a very equitable health service.

But, I explained in my talk, the current global system of research and development on new health technologies like an AIDS vaccine does not work as well as it should. Research activities and spending are not well coordinated. Promising ideas from research often do not get out of the lab and into product development fast enough. Industry does not have the necessary financial incentives to discover and manufacture an AIDS vaccine, because it is unlikely to be a very profitable investment for

them, as compared to new treatments for cholesterol, obesity, and impotence. Developing country scientists and political leaders are not yet at the centre of the global effort to find a vaccine.

An improved system of health R&D is needed, I argued, including expanded and more targeted funding; stronger global scientific coordination; new incentives for industry such as Advance Market Commitments; a bloc of leading developing countries such as India to support accelerated AIDS vaccine R&D and; an existing Product Development Partnership like IAVI to advocate and help drive the field.

Several of the other sessions at the Global Forum reinforced the themes of my plenary session. A leading researcher from the London School of Economics reported favourably on the impact that Public-Private Partnerships were having on the development of new drugs for malaria, tuberculosis, Chagas disease, dengue fever, and other tropical diseases. The critical future role of India and other “innovating developing countries” such as Brazil, South Africa, China, and Korea in creating new health technologies was also highlighted.

Overall, the Forum was valuable in facilitating the exchange of the latest information on biomedical progress in addressing the health needs of developing countries, and on the growing area of research on health delivery ‘systems’. Participants also had a chance to renew their sense of common commitment to focusing greater political attention and financial resources on the health needs of developing countries.

I am optimistic that vaccines, and AIDS vaccines in particular, will be the central theme of the Global Forum in the coming years.

The author is Senior Vice President for Public Policy, IAVI. ■

THE VACCINE TEXTBOOK

Reproduced from a report in the September edition of the LAVI Newsletter. Access full text at www.iavi.org/AIDSandMDG_report

Putting it Together: AIDS and the Millennium Development Goals

How we fare in the fight against AIDS is crucial. Halting the spread is not only a Millennium Development Goal in itself; it is a prerequisite for reaching most of the others. Only if we meet this challenge can we succeed in our other efforts to build a humane, healthy and equitable world. Let us ensure we are equal to it.

Kofi Annan, Secretary General, United Nations

In September 2000, 189 governments from around the world signed the Millennium Declaration in which they committed to achieving sustainable reductions in all dimensions of extreme poverty. To track progress against this visionary global compact, the Millennium Development Goals (MDGs) were established as eight quantifiable and shared priorities to be achieved by 2015. Although each MDG is tracked separately, the reality is that they are strongly interlinked.

A key factor in determining whether countries can attain the MDGs is their response to HIV/AIDS. This is because HIV/AIDS not only has severe health repercussions - and thus one of the MDGs is to halt and reverse the epidemic - but because AIDS is a major threat to other development goals. The pandemic's scale will make it difficult for many countries to achieve their targets to lower poverty rates, reduce child mortality, achieve universal primary education and curb the global tuberculosis epidemic.

MDG Goal: Eradicate extreme poverty and hunger

HIV/AIDS increases poverty

Countries with 20 percent HIV prevalence will see their annual rates of GDP growth lowered by 2.6 percent, due to a reduction in growth per capita and a slower rise in population. At the end of a 20-year period, GDP could be 67 percent lower than it would have been without AIDS. A study from Botswana shows that due to high medical costs and deaths of working-age adults, HIV/AIDS can be expected to lower average income per capita by 10 percent over the next 10 years. It also predicts that the share of households below the poverty line will increase by 6 percent.

HIV/AIDS worsens the nutritional status of children

There is growing evidence of an important link between child nutrition, food security, and HIV/AIDS. AIDS under-

mines child nutrition through parental mortality: orphaned children are more likely to live in poverty and to receive inadequate nutrition than children in non-orphan households.

MDG Goal: Achieve universal primary education

AIDS compromises efforts to reach universal primary education

Children in AIDS-affected areas may drop out of school because they can no longer afford fees or supplies or because their families increasingly rely on them to contribute economically to the household and to provide care for ill family members. Teacher absenteeism and death may also affect rates of primary school completion. In many poor countries, administrators face large challenges in finding qualified teachers to replace those who have died, and schooling suffers as a result.

MDG Goal: Reduce child mortality

AIDS has a negative impact on child mortality

Children under 15 represent approximately one-sixth of annual AIDS deaths worldwide. Of these, most are infected through perinatal transmission. As the mean survival time for HIV-positive children is about three years, 60 percent will die before their fifth birthday. Additionally, the effects of AIDS on families and communities render children more susceptible to illness and death from other causes. Several studies have shown that children born to HIV-infected mothers are approximately three times more likely to die than children born to uninfected mothers.

MDG Goal: Combat infectious diseases

HIV/AIDS undermines global efforts to control Tuberculosis

The epidemics of HIV and tuberculosis (TB) are closely in-

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tertwined. One-third of people with HIV are also infected with TB, and as their immune systems are increasingly compromised, they have a heightened susceptibility to active TB, which, because of their HIV is harder to diagnose and treat. Rising rates of HIV are associated with increased TB burdens, with approximately 9 percent of the estimated 8.3 mil-

lion new adult TB cases worldwide in 2000 directly attributable to HIV.

Beyond 2015, to sustain and extend development progress, developing countries require new and better technologies for more effective prevention, diagnosis and treatment of HIV - especially an AIDS vaccine, which represents the best hope for eventually controlling the epidemic. ■

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cells it infects, which is then used to produce new virus particles in active cells. This process leads to a stage called 'apoptosis' in which the CD4+ T cell counts fall. Some HIV-infected cells do not die, but remain hidden and dormant and pose the risk of generating new HIV particles if they are activated by stimulation of the immune system. VPA inhibits histone deacetylase (HDAC)-1, an enzyme crucial for keeping HIV's genes hidden within the host cell's DNA, which may, in turn, suppress HIV promoter activity in latently infected, resting CD4+ T cells. The study showed that valproic acid can stimulate the release of HIV from resting, infected T-cells.

Existing antiretroviral drug combinations, while capable of reducing HIV viral load to undetectable levels in the blood, cannot eliminate HIV's genes from the human DNA. Also, even years after discontinuation of a given drug, resistant strains of HIV-1 quickly re-emerge when the drug is re-introduced into a thera-

peutic regimen. Therefore, in theory, a treatment protocol that eliminates the reservoir should eliminate recurrence of drug-resistant strains and must have the potential to cure HIV infection.

Words of Caution

The results of The Lancet study are encouraging, but must be considered with caution. The researchers admit that their pilot study is limited and leaves many questions unanswered.

- ❖ By design, the study was not controlled and as each patient received two new drugs — enfuvirtide and VPA — the relative contribution of each drug is not known.
- ❖ It also raises important issues regarding the use of enfuvirtide in an intensification regimen. As reported, two patients had residual viremia after intensification with enfuvirtide, which makes it unclear whether intensification is necessary or especially beneficial for the treatment.
- ❖ The study also fails to provide an insight into the possible mechanism of VPA on the resting CD4+ T-cells.

❖ Another critical aspect that remains unanswered is what happens to the pool of latently infected cells after enfuvirtide and VPA are discontinued? The study shows VPA works quickly *in vitro* to induce virus production from latently infected cells but *in vivo*, very few new latently infected cells would be expected to develop over the duration of treatment.

❖ The biggest assumption of the study, that the population of latently infected, resting CD4+ T cells is the only reservoir for HIV-1 *in vivo*, may not be correct. If there is persistence of these cells, the elimination of latent cells may not result in eradication of the virus. Other pools of HIV-infected cells or tissue reservoirs may exist.

While *The Lancet* study certainly provides cause for optimism, it must be followed with rigorous research on several questions that have been raised by other global reviews. While holding out great promise, further evaluations of the efficacy of VPA in combination with other anti-HIV drugs will be needed in larger, controlled clinical studies. ■

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IAVI is a scientific organisation founded in 1996 whose mission is to ensure the development of safe, effective, accessible, preventive HIV vaccines for use throughout the world. IAVI focuses on four key areas: accelerating scientific progress; education and advocacy; ensuring vaccine access and creating a more supportive environment for industrial involvement in HIV vaccine development.



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