

A significant discovery, now a dream for a cure



Chris Black/WHO

Françoise Barré-Sinoussi

HIV in low-income countries in sub-Saharan Africa and south-east Asia.

Françoise Barré-Sinoussi is a French virologist and head of the Retroviral Infection Control Unit at the Pasteur Institute in Paris. She joined the institute in the early 1970s and, during the 1980s, she performed some of the fundamental work on the identification of HIV as the cause of AIDS, a discovery for which she was awarded the Nobel Prize in Medicine in October 2008, together with her colleague Luc Montagnier. Much of her more recent work has been in establishing collaborations between French experts and health workers and people living with

Françoise Barré-Sinoussi spoke to the *Bulletin* about her work on HIV research and of her hopes for progress in knowledge and treatment.

Q: What was the sequence of events that led to the discovery of HIV back in the early 1980s? What was the atmosphere in your team when you realized that you had identified a new virus?

A: The discovery wasn't made at a specific moment but was a progressive process involving close work with our clinician colleagues, from the bedside [of patients] to the bench and back to the bedside. In June 1981, reports started emerging in the United States of America of cases of pneumocystis pneumonia among previously healthy men in Los Angeles, and later in other cities. In January 1983, Willy Rozenbaum, a clinician who knew that we were working on retroviruses, approached us with a patient who had gone into a stage of immunodeficiency and who had agreed to accept a lymph node biopsy.

We thought that it could be a type of HTLV (human T-lymphotropic virus, the first human retrovirus, which was identified in 1977), so we had to grow the virus in culture and see if it had any relationship with HTLV. We checked the culture every three to four days and managed to keep the virus-infected cells alive for three weeks by adding lymphocytes from donors. This strategy turned out to be a good one. If we had left the culture for months, all the cells would have died. In May 1983, we were able to report in *Science* that we had isolated a new virus that was probably causing the disease known as AIDS. This was proven a few months later. I remember telephoning a friend

in the US to say that I thought we had a new discovery. He joked that I should throw it all in the trash because of what we would unleash.

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Q: According to UNAIDS, in 2007 there were 33 million people living with HIV, 2.7 million people newly infected with the virus and 2 million deaths worldwide. What challenges remain in the fight against HIV/AIDS 25 years after your discovery?

A: There has been a lot of progress towards providing access to treatment but we still have a lot to do in this area. It is a United Nations goal that, by 2010, everyone living with HIV should have access to antiretroviral treatment. Today only 30% of those in need have access to it in low- and middle-income countries. While universal access will be extremely hard to achieve, we need to advocate for this goal so that governments continue

to work towards it. Caring for people with HIV is a lifelong commitment that involves dealing with chronic disease, drug resistance and, of course, prevention. We have had partial success in preventing transmission, particularly from mother to child, but so many women still don't have access to these programmes. Work is in progress on vaccine development, microbicides and pre- and post-exposure prophylaxis. While there are economic limits, the dream is to find a cure for HIV infection.

Q: Why is it so difficult to develop a vaccine for HIV?

A: The genetic variability of HIV is one obstacle, another is the way the virus stores itself in 'reservoirs' such as the lymph nodes of the intestinal region. Eradication will not be easy because the virus stays in these 'reservoirs' and is not affected by the immune response, even after 10 years of antiretroviral treatment. When treatment is interrupted, the virus is reactivated and patients experience a recurrence of the disease. There is evidence today that the immune response to HIV occurs much earlier than previously thought. It is possible that everything is determined in the hours following infection. Early diagnosis and treatment are very important; maybe we are treating people too late now. If we can better understand the way the infection evolves in the host, then we can work on developing therapeutic vaccines. A vaccine should aim to block cell-to-cell transmission, but we don't know how to do this yet. If we can make progress in developing vaccine strategies for HIV, then I'm convinced that we will make progress in developing vaccines for other diseases too.

Q: People working on other health problems sometimes feel that a disproportionate amount of money is allocated to HIV/AIDS.

A: I'm very surprised to see conflict between people working, for example, on avian flu or malaria research, saying that too much money is devoted to HIV and not enough to other diseases. It is a mistake and a misconception to oppose the fight against HIV in favour of other health issues. Working

together is the best response to global health issues in general. I've seen the impact that HIV care, prevention and treatment programmes have on strengthening health systems. I wonder whether we could have avoided the current situation of multidrug resistance in tuberculosis patients if the communities working on HIV and tuberculosis had been working more closely together from the beginning. My message to the global health community is that we must continue the efforts that we started, with a strong commitment from governments in industrialized countries. The transmission of this virus is easily prevented and the promotion of practices such as condom use are key. We also need to promote testing to enable early diagnosis and treatment.

Q: Can you name an example where this is already happening?

A: In Cambodia there has been an improvement overall in the health system as a result of specific work on

HIV. In 1995, the country didn't really have a functioning health system. By 2008, it had 50 sites for patients with opportunistic infections and antiretroviral treatment, 26 sites for paediatric HIV care and 4 sites for monitoring CD4+ counts. With the support of the Global Fund to fight AIDS, Tuberculosis and Malaria, 30 000 patients are now enrolled in HAART (highly active antiretroviral therapy) programmes. We expect that everyone who needs treatment there will be covered by 2010. The effect is not only improving the health of people with HIV but of those with other diseases such as tuberculosis.

Q: What projections do you have for a child born with HIV today?

A: As a researcher, I lack the ability to be completely optimistic. But if we can treat people early, then we can bring them hope. Prolonging life might provide time to develop new strategies for the future. I'm not sure that we will succeed in eradicating the disease but I

am convinced that we'll be able to treat all HIV carriers so that they no longer have detectable levels of the virus and cannot transmit it to others.

Q: How has winning the Nobel Prize affected you?

A: I feel an enormous responsibility. I hope that I will be able to convey a strong message to the authorities, to political organizations and to youth that it's time to provide incentives to young researchers to work on HIV. We strongly need new spirit if we want to develop creative, novel strategies for a vaccine. We need to encourage scientists from other areas, such as immunology, even nanotechnology. Myself, I want to go back to the lab! At one point in my life, I wondered whether I had made the right choice to concentrate on this particular virus. But, for me, it's sufficient to go to Africa or south-east Asia and interact with people living with HIV. The motivation comes when I feel that I can really help the people affected. ■

Recent news from WHO

- More than 2000 children die each day as a result of unintentional or accidental injuries, according to a report by WHO and the United Nations Children's Fund released on 10 December. Read the report, entitled **World report on child injury prevention**, here: http://www.who.int/violence_injury_prevention/child/injury/world_report/en/index.html
- As of 9 December, Zimbabwe's Ministry of Health reported 16 141 suspected **cholera** cases resulting in 775 deaths since August 2008 in two-thirds of the country's 62 districts. WHO said that the overall case fatality rate was 4.8%. WHO is establishing a cholera control and command centre, in conjunction with the Ministry of Health and Child Welfare and other health partners.
- In a meeting held by WHO in Ottawa, Canada, on 1–4 December, food safety experts set a level of 0.2 milligrams of **melamine** per kilogram of body weight as the maximum that can be tolerated by a person. The chemical was found in milk, milk products and other animal-origin products in recent months.
- Annual **measles deaths** fell globally by 74% between 2000 and 2007, WHO announced on 4 December, from an estimated 750 000 to 197 000.
- Michel Sidibé of Mali was appointed the new **Executive Director of UNAIDS** on 1 December, World AIDS Day. Sidibé takes over from Dr Peter Piot on 1 January 2008.
- Lack of availability of **essential medicines** in the public sector drives patients to pay higher prices in the private sector or to go without, according to a WHO study reported in the online edition of the *Lancet* on 1 December.
- Universal and annual voluntary **HIV testing** followed by immediate antiretroviral therapy – irrespective of clinical stage or CD4+ level – can reduce new HIV cases by 95% within 10 years, according to new findings based on a mathematical model developed by a group of HIV specialists at WHO. WHO said that these findings, published in the *Lancet* on 26 November, aimed to stimulate discussion and further research and did not imply any change in WHO guidance.
- Delegates at the **Global Ministerial Forum on Research for Health** issued a Call to Action urging governments to allocate at least 2% of the budgets of health ministries to research and development agencies. The 17–19 November meeting in Bamako, Mali, also urged governments to pursue innovative financing mechanisms for research for health and to link evidence to policy-making.
- The first WHO Congress on Traditional Medicine took place in Beijing, China, 7–9 November, and was opened by the Director-General and attended by experts from more than 70 countries. During the Congress participants adopted the Beijing Declaration on **traditional medicine**. The Declaration aims to promote the safe and effective use of traditional medicine, and to integrate traditional medicine into national health care systems.

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