Truth and Heresy
About AIDS

Inventing the AIDS Virus
by Peter H. Duesberg.
Regenery, 722 pp., $29.95

Infectious AIDS:
Have We Been Misled?
by Peter H. Duesberg.
North Atlantic, 582 pp., $18.95

AIDS: Virus- or Drug Induced?
edited by Peter H. Duesberg.
Kluwer Academic, 358 pp.,
$227.50, $49.50 (paper)

1.

After more than a decade of intensive medical research into AIDS, of energetic international public health campaigns and the emergence of a vast academic and commercial industry built around human immunodeficiency virus (HIV), the confident observer might dismiss the following proposition:

Despite enormous efforts, over 100,000 papers and over $35 billion spent by the US tax payer alone, the HIV-AIDS hypothesis has failed to produce any public health benefits: no vaccine, no effective drug, no prevention, no cure, not a single life saved.
The scientist who made this statement is not an obscure crank. He is Peter Duesberg, a professor of molecular and cell biology at the University of California at Berkeley, a brilliant virologist, and the former recipient of an award for outstanding investigative research from the National Institutes of Health (NIH). Duesberg discovered the first cancer-related gene in 1970. Yet he is now perhaps the most vilified scientist alive. His work inspires excoriating attacks. In a review of *Inventing the AIDS Virus*, published in the scientific journal *Nature*, John Moore, who works at the Aaron Diamond AIDS Research Center in New York, concluded:

Duesberg wraps together his twisted facts and illogical lines of argument to create a tangled web to trap the unwary, desperate or gullible. But however much he attempts to gild his writings with philosophies of scientific truth, the reality is that his premises are based not on facts but on faith: faith that he is right, and everyone else is wrong. How sad, and how ultimately pathetic.¹

What extraordinary course of events has led him to be dismissed by his peers and ridiculed by his colleagues?

Duesberg makes two astonishing claims. First, that HIV is not the cause of AIDS. And, second, that since AIDS cannot be understood as a single disease, it must have different causes according to which group of people—hemophiliacs or homosexual men, for example—one studies. The case against HIV is made by Duesberg in fifteen articles, in *Infectious AIDS: Have We Been Misled?*, and in *AIDS:


*Virus- or Drug Induced?* Three years after its first announcement, and three publishers and five editors later, his most recent book, *Inventing the AIDS Virus*, draws together these arguments into a historically and logically coherent tale. In describing AIDS as "a fabricated epidemic," he recounts the scandals of misleading research, the accusations of fraud leveled against scientists such as the co-discoverer of HIV, Robert Gallo, and the hyperbole of early estimates predicting the huge epidemic proportions of AIDS. And in an unusual aside, the publisher, Regnery, sheds neutrality by declaring that "if Duesberg is right in what he says about AIDS, and we think he is, he documents one of the great science scandals of the century."

On the basis of thirty years' research experience into the group of viruses known as retroviruses, he acquires HIV as the cause of AIDS. He shows how dissidents who share his view have been snubbed by most other scientists. They have been forced to organize their activities into small covens, of which one is the Group for the Scientific Reappraisal of the HIV-AIDS Hypothesis. He recounts how scientists who have flirted with dissident views, such as Luc Montagnier, who, with Gallo, identified HIV, have been dissuaded from pursuing their alternative theories. He uses the examples of scurvy, beriberi, and pellagra to show how infectious agents have been blamed as causes of common diseases only to be cleared years later when it was admitted that scientific evidence failed to satisfy hastily constructed theories. He argues that diabetes, multiple sclerosis, and many other diseases have been falsely attributed to infectious causes. The same, he believes, is true of AIDS.

Duesberg does not substantiate his argument with new data. Rather, he believes that "the answers will instead be found by reinterpreting existing information...[in order] to make sense of the data already in hand." His close reading of published research aims to provide detailed refutations of every assumption and every piece of evidence involved in creating the HIV-AIDS theory. But the core of his case rests on two propositions. Existing theories about the cause of AIDS are based on circumstantial—namely, epidemiological—evidence and not direct scientific proof. The epidemiological evidence is that HIV has been found in all persons who have had AIDS. The orthodox view is best summarized by the American AIDS epidemiologist William Blattner and his colleagues:

The strongest evidence that HIV causes AIDS comes from prospective epidemiological studies that document the absolute requirement for HIV infection for the development of AIDS.

Duesberg constantly warns against such epidemiological inferences because of their inherent uncertainty. In 1988, he argued that an "epidemiological correlation" is insufficient because such evidence cannot distinguish between HIV and other causes, unless there is also evidence for biochemical activity of HIV in AIDS.

In 1993, he elaborated further:

Because of its descriptive nature, epidemiological search for an infectious pathogen is restricted to correlations... Epidemiology can...never prove that an infectious agent causes a disease.

In addition to this failure to prove causality, Duesberg contends that
AIDS is not an infectious disorder. In supporting this view, he challenges the efforts to implicate other viruses as causes of human diseases. He casts doubt on the alleged associations reported between the human papilloma virus and cervical cancer, between hepatitis B and liver cancer, and hepatitis C virus and hepatitis, together with the viruses allegedly linked to various lymphomas and leukemias. Citing evidence suggesting that HIV infection was present in the 1960s and 1970s, he also asserts that HIV is not a new virus.

If AIDS was caused by an infectious agent, Duesberg claims, one would expect it would have five specific characteristics: (1) it would spread randomly between the sexes; (2) the disease would rapidly appear—at least within months; (3) it would be possible to identify "active and abundant [HIV] microbes in all cases"; (4) cells would die or be impaired, beyond the ability of the body to replace them; and (5) we would see the development of a consistent pattern of symptoms in those infected. None of these expectations has been met. In the US and Europe, men are affected far more commonly than women; the onset of clinical disease takes a median of ten years; the virus is difficult to isolate in patients with AIDS. Nor are the direct effects of the virus on one group of target cells, called CD4 lymphocytes, believed to be responsible for the observed immunodeficiency. And the symptoms vary strikingly, for example, between Africa and America, although they have a supposedly common infectious origin.

Arguments such as these have persuaded respected scientists to express their skepticism that HIV is the cause of AIDS. Kary Mullis, who won the Nobel Prize for chemistry in 1993, writes in his foreword to Inventing the AIDS Virus:

I like and respect Peter Duesberg. I don’t think he knows necessarily what causes AIDS; we have disagreements about that. But we’re both certain about what doesn’t cause AIDS.

We have not been able to discover any good reasons why most of the people on earth believe that AIDS is a disease caused by a virus called HIV. There is simply no scientific evidence demonstrating that this is true.

Is AIDS a single disease? No, says Duesberg. HIV is present in different groups: homosexual men and women, heterosexual men and women, injecting drug users, hemophiliacs, and children (who are infected during pregnancy, at birth, or from breast feeding). And the differences in the symptoms of AIDS among these groups prove, Duesberg believes, that HIV cannot be the common cause for such geographically and demographically divergent clinical events: Kaposi’s sarcoma is more common among homosexual men; infection in Africa is associated with wasting diseases, which cause drastic reductions in weight, whereas in Europe and the US infections like Pneumocystis pneumonia are more common. In Duesberg’s view, the Western form of AIDS is caused by long-term recreational use of drugs, such as cocaine, nitrates, amphetamines, or drugs used to treat AIDS itself—AZT, for instance. (The evidence from surveys that many homosexuals in fact take nitrates to enhance sexual experience or take other drugs such as amphetamines and cocaine is central to this argument.)

The hypothesis linking AIDS and drugs, Duesberg believes, resolves several longstanding paradoxes about the AIDS pandemic. American AIDS is new not because of HIV, which is an old infection, but because drug use has spiraled during the past twenty years, especially in men below the age of forty. Many diseases associated with AIDS, such as dementia, do not depend on a state of immunodeficiency. If the drug hypothesis is correct, diseases in developing countries that are “associated” with HIV infection would no longer be forced to fit into the invented category of AIDS, thereby creating a syndrome with a pattern entirely different from its Western counterpart. What Duesberg calls the “drug-AIDS hypothesis” would lead us to conclude that many of the diseases now defined as AIDS in the
developing countries are old diseases—tuberculosis and salmonella infection among them—and occur equally between the sexes. Any evidence of HIV infection is an irrelevant coincidence. In all settings, Duesberg writes, HIV is a harmless “passenger” and does not cause disease.

Where does this radical argument take us? Duesberg writes,

The drug-AIDS hypothesis predicts that the AIDS diseases of the behavioral AIDS-risk groups in the US and Europe can be prevented by controlling the consumption of recreational and anti-HIV drugs, but not by “safe sex” and “clean injection equipment” for unsterile(!) street drugs.

Here Duesberg’s arguments take him into dangerous territory. For if HIV is not the cause of AIDS, then every public health injunction about the need for safer sex becomes meaningless; every call to offer clean needles to injecting drug users may be unnecessary—or worse. Duesberg notes that “the clean-needle program of the AIDS-establishment would appear to encourage rather than discourage intravenous drug use.” And, he writes, most remarkably of all, that “screening of blood for antibodies to HIV is superfluous, if not harmful, in view of the anxiety that a positive test generates.” In his opinion “AZT is AIDS by prescription”; this drug should “be banned immediately.”

How could so many scientists have got it all so badly wrong?

2.

The thesis that HIV is the cause of AIDS is undisputed by most other researchers. Duesberg accepts that epidemiological investigations find an association between the virus and the syndrome. His tactic is to argue that HIV is merely what scientists call a “confounding variable”: that is, its presence is explained by its relation with the much more significant history of drug use. HIV and AIDS-related diseases, such as Kaposi’s sarcoma, are for Duesberg all simply the results of drug use, the true cause of AIDS. To be sure, one task of AIDS research has been to convert statistical associations into clear statements about physical factors that seem likely to increase the risk of immunodeficiency. There is now substantial evidence—the life cycle of HIV, the events surrounding early infection, and the damage to the immune system as the disease progresses—to show how HIV might lead to a state in which the immune system fails to function. Duesberg recognizes the importance of this evidence. He writes, however, that “even a perfect correlation with HIV does not prove causation without functional evidence.” That “functional evidence” is now accumulating rapidly. However, researchers readily admit that there are huge gaps in our understanding. In the recent authoritative account, The Molecular Biology of HIV/AIDS, edited by A. M. L. Lever, scientists write:

Despite knowing so much about the molecular biology of HIV we still have little understanding of how HIV causes AIDS and why progression to disease can take a long and variable time.

It still remains to be established precisely how viral replication and viral gene expression are regulated and how they influence progression to clinically significant immunodeficiency.

The cell type which is first infected following HIV transmission has still not been defined.²

These uncertainties do not mean that HIV is not the cause of AIDS. Here is an important distinction that Duesberg ignores. Though we may not understand exactly how HIV causes AIDS, we have a large, most scientists would say overwhelming, mass of evidence linking HIV to this form of acquired immunodeficiency. HIV has been shown to be a necessary factor for the occurrence of AIDS. Whether it is sufficient remains open. The likeli-

The human immunodeficiency virus. An outer protein coat is studded with knob-like projections (gp160) which facilitate entry into nearby cells that display CD4 molecules. The virus particle contains two copies of its genetic material, RNA, which, after processing by an enzyme called reverse transcriptase, eventually becomes fixed in human DNA, initiating a series of events leading to immunodeficiency.

hood is that there are genetic, constitutional, and environmental influences, all of which modify the effect of HIV on its host. Some accelerating the emergence of the disease, some perhaps even preventing HIV infection. For example, William Paxton has recently reported immunological differences—such as increased release of certain active substances, called chemokines, from CD4 cells—that produced resistance to HIV infection in twenty-five people who had “multiple high-risk sexual exposures” to HIV (i.e., people who had unprotected receptive sex with partners who subsequently died of AIDS). Paxton has yet to find a full explanation for such resistance but speculates that it might account for the variable rates of the progression of the disease seen in those with HIV infection.

Moreover, that HIV infection can be exacerbated or retarded by other factors—“cofactors”—has long been recognized as important. The unpredictable course of illness raises the possibility that other microorganisms might be candidates affecting the pathogenicity of HIV. In addition, as yet unidentified viruses might be involved in causing the diseases that are now considered integral parts of AIDS. One such virus, a new herpes virus, was recently reported to be the cause of Kaposi’s sarcoma, once classed as a disease that defined AIDS and therefore also HIV.

Could drugs be an additional cofactor? Duesberg writes that there are high rates of drug use among AIDS patients, and he has correlated drug use “epidemiologically and chronologically” with the AIDS epidemic in both the US and Europe. He cites studies showing that 96 percent of representative groups of male homosexuals had used nitrite inhalants, up to 70 percent had used amphetamines, and up to 60 percent cocaine or LSD. His uncompromising rejection of the causal power of epidemiological evidence is temporarily set aside when he dogmatically affirms that distinct AIDS diseases occur in distinct risk group[s]—because they use distinct drugs (e.g., users of nitrites get Kaposi sarcoma, users of intravenous drugs get tuberculosis, and users of AZT get leukopenia and anemia). The duration and toxicity of drug consumption and individual thresholds for disease determine when AIDS occurs, irrespective of whether HIV infects.

Here Duesberg has abandoned the skepticism about epidemiology that he deployed so tenaciously in his criticisms of HIV causality. In fact, the issues he raises have been tackled by researchers. Well-designed studies cited in A.M.L. Lever’s book show that

Perhaps the best evidence that HIV is sufficient by itself to cause AIDS comes from the elimination of virus-infected blood from the US transfusion service. Screening of blood for HIV began in 1985...
the annual probability of developing AIDS does not differ significantly between haemophiliacs infected via factor VIII [i.e., a clotting protein, whose absence leads to bleeding], homosexuals infected sexually and those who acquired HIV as a consequence of intravenous drug use. These findings provide presumptive evidence against a role for bacterial infections or for drug and alcohol use, all of which are more common in intravenous drug users, in disease progression.6

Duesberg’s inconsistent use of language also betrays his lack of objectivity. He argues that some infections—“old parasitic” diseases, such as tuberculosis—and other noninfectious and cancerous conditions associated with AIDS are “indicators of an acquired immunodeficiency.” The error in this argument should by now be clear. The plethora of conditions that are associated with AIDS reflect those diseases present in the local environment and are consequences of HIV-induced damage to the immune system; they are not simply “indicators” of a newly invented syndrome.

The AIDS pandemic in sub-Saharan Africa, driven mainly by heterosexual transmission, provides Duesberg with an opportunity to stretch his theory beyond the bounds of all reasonable belief. He calls it a “myth” and repeats the argument that “none of the African AIDS diseases is new.” The facts are these: the World Health Organization estimates that, up to the end of 1994, over eleven million Africans have become infected with HIV. In Uganda, adult infection rates range from 1 percent to as high as 30 percent in some villages. In a belt of countries beginning in the Central African Republic and sweeping eastward and then south, urban rates of HIV infection are nearly 25 percent. In Musuka district, in southwest Uganda, if you are an HIV-positive adult you are twenty times more likely to die than if you are HIV-negative. To claim that HIV is not causally associated with immunodeficiency-related diseases is to ignore the evidence of thousands of deaths.

Another crucial, and decisive, line of evidence refuting Duesberg comes from the hemophiliac population.7 The British researcher Sarah C. Darby reported last year on deaths among the UK population of hemophiliacs between 1977 and 1991. Between 1977 and 1984, the annual death rate among patients with severe hemophilia was 8 per 1000. Between 1985 and 1992, this rate remained identical among HIV-negative hemophiliacs but increased to 81 per 1000 in 1991–92 in those with HIV infection. Moreover, interruption of the spread of HIV clearly prevents the occurrence of AIDS. Contrary to Duesberg’s hypothesis, preventing HIV transmission prevents AIDS.

3.

How might HIV cause AIDS? HIV is a retrovirus and exists as two distinct species: HIV-1 and HIV-2. HIV-2 is found in West Africa and is less pathogenic than HIV-1. HIV is composed of a spherical protein case containing two identical pieces of genetic material (ribonucleic acid, or RNA), and it is coated by a membrane through which point 72 surface projections. These projections are called gp120/gp41 and are collectively known as gp160; they bind the virus to human cells. The core of the virus also contains three enzymes—reverse transcriptase (RT), integrase, and protease. In total, the genome of HIV contains the code responsible for making at least seventeen proteins, many of which have important regulatory roles, such as one called Nef.

The life cycle of HIV begins when gp120 binds to a molecule called CD4 on the surface of the blood cells known as macrophages and lymphocytes. HIV then enters the cell: the next step is critical. The unique feature of a retrovirus is its ability to take over the machinery of the cell by converting its RNA to DNA, using the enzyme RT to do so. (Drugs such as AZT, didanosine, and zalcitabine are used against AIDS because they inhibit the effects of RT.) Viral DNA is then permanently integrated into the host cell’s own total complement of genetic material, or genome. Subsequent viral replication is helped by several factors, but the most powerful are viral proteins called Tat and Rev. If either of these proteins fails to function, HIV becomes noninfectious. Finally, assembly of the complete virus requires the enzyme protease. Therefore Tat, Rev, protease, and Nef are all potential targets for anti-HIV therapy.

HIV can be transmitted sexually. It can also be transmitted before, during, and after birth. It can also be transmitted occupationally (through needlestick injuries), as well as through unsterilized blood products or contaminated equipment (needles and syringes). It was formerly thought that the virus, once integrated in a host cell, existed in a latent phase. Duesberg makes much of this belief. In 1995 he wrote that

HIV is latent, and neither chemically nor clinically detectable in “HIV antibody-positives” [i.e., people with HIV] with and without AIDS.

This is not so. Soon after it is assembled, HIV undergoes tremendous replicative activity and a high level of virus can be found in the blood. Although the virus is then cleared from the blood, replication continues apace throughout the body’s lymphoid tissue, which is the main repository of our im-


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May 23, 1996

mune system. This continued and damaging activity over the long term is believed to lead to immunodeficiency, leaving the infected individual susceptible to infections, such as Pneumocystis, and cancers, such as lymphoma.

One long-running dispute has concerned the way that HIV destroys immune cells. Duesberg has argued that HIV could not possibly kill CD4-bearing cells directly. In 1987 he wrote that HIV is “not directly cytoidal” — i.e., does not kill cells directly. In 1995, other scientists conceded this point. Simon Wain-Hobson, without crediting Duesberg’s original claim, wrote that “an intrinsic cytopathic effect of the virus is no longer credible.” Just how HIV does kill immune cells remains a central question. Once infection has taken place, the disease is clinically latent — i.e., usually it is not expressed in AIDS symptoms for some years, even though the viruses are replicating. Martin Schechter has shown, however, that cases of AIDS developing in a group of gay men occur only in those with pre-existing HIV infection. The reasons for the variable rate at which the immune system declines remain unclear. It may be that drugs, such as nitrates, interact with HIV in some unknown way to influence the progression of the disease. Such a finding would not affect the conclusion that HIV is the cause of AIDS, but it would throw light on the confusing evidence about the variable course the disease takes. In any case, what is clear is that (1) during clinical latency, HIV is present in abundant quantities in lymphoid tissue and, (2) as the clinically latent interval becomes longer and as lymphoid tissue is gradually damaged, there is a corresponding increase in the viral load in the blood. The eventual disruption and degeneration of the immune system produces a significant immunodeficiency: AIDS.

4.

Despite this progress in understanding


the fundamental biology of HIV, advances in treatment have been disappointing. Duesberg interprets these genuine frustrations as proof that “the war on AIDS has been a colossal failure.” It is true that several key questions remain unanswered. The most alarming uncertainty is that even now no one quite knows the best time to begin treatment with antiretroviral drugs. Still, by stark contrast with Duesberg’s view, most scientists agree that treatment directed against the virus has the best hope of success. In the words of a leading AIDS researcher, David Ho of the Aaron Diamond AIDS Research Center, it is “time to hit HIV, early and hard.”

How justified is this belief?

On purely biological grounds, such a conclusion is perfectly reasonable. Following infection, millions of new virus particles are produced each day. Early treatment to inactivate these viruses before long-term damage to the immune system takes place makes good sense. Recent data on the effect of AZT in patients with acute HIV infection show promising benefits from such an aggressive treatment policy.

However, in their enthusiasm for these tantalizing advances, many AIDS researchers forget that the key question for the patient is whether a new treatment will prolong life or improve its quality. An exclusive focus on the virus beyond all else, even the patient, has produced some, plainly absurd claims. At the last international conference on AIDS, held in Yokohama, Japan, in 1994, the World Health Organization’s Joep Lange said, almost incomprehensibly, that “the virus is the real thing. Clinical end points [i.e. relieving symptoms and prolonging survival] are the surrogates.” The unfortunate truth is that clinical trials have often failed to support the biologically plausible assumption that it is never too early to treat people.

Trials of drugs to combat HIV infection have passed through three phases. The first period began and ended in 1987 with the publication of a single clinical trial that showed that AZT helped patients with HIV infection who had symptoms of disease to survive longer. AZT was licensed for use shortly afterward and optimism ran high. From 1987 to 1994, a deepening mood of pessimism bordering on cynicism set in. Several early studies were based on the notion that early treatment — when the patient was infected but free of symptoms — was the sensible and biologically plausible course. They seemed to indicate that intervention in symptom-free or early symptomatic stages of HIV infection might be beneficial. However, in 1992 J.D.

Hamilton and his colleagues showed that AZT produced no survival benefit in patients with early symptoms. This result was followed by the devastating findings of the Anglo-French Concorde study group. In this, the largest and longest trial of AZT in HIV-positive men and women, early use of the drug conferred no advantages. Worse still, further studies have shown significantly more deaths in the group treated early. The Concorde study also showed that commonly used “soft” measures of a drug’s efficacy, such as the lower or higher number of CD4 cells in the blood, were no substitute for “harder” clinical measures, such as survival.


More recently, there has been some reason for optimism. First, a trial in pregnant women\textsuperscript{14} showed that the transmission rate of HIV to children was cut by two thirds in women taking AZT. And in September 1995, at a conference in Copenhagen, the results of two trials, as yet unpublished, were reported, which showed that therapy combining AZT with either didanosine or zalcitabine (both RT inhibitors) significantly improved survival rates over those from AZT alone. It is now clear that two drugs are better than one. The discovery of still newer agents—notably the protease inhibitors saquinavir, ritonavir, and indinavir (all these are now approved for use by the US Food and Drug Administration)—offer possibilities for triple therapy with drugs targeted at different parts of HIV. For example, at a Washington meeting during January this year, ritonavir was claimed to reduce death rates by over 40 percent (to 4.8 percent) in over one thousand patients with severely compromised immune systems over seven months. (They had fewer than 100 CD4 cells per micro-liter of blood; the normal range is 800–1200.)\textsuperscript{17}

To resolve which combination of new drugs is the best initial regimen will take many more trials such as Concorde. But the advent of these new drugs will not provide straightforward answers. HIV rapidly develops resistance to AZT and HIV may develop resistance to the newer agents as well. The standard method of judging the efficacy of a new treatment is the controlled trial in which patients randomly receive either the new drug or the existing standard treatment (or a placebo). This was the method used in the Washington study. Each new anti-HIV agent or new combination of agents will have to be tested in this way; and there are many other new candidates.\textsuperscript{19} If it is true that survival is the only reliable measure of drug efficacy, one will have to wait two to three years for each trial of each new treatment combination to produce a valid result.\textsuperscript{18} The increase in our knowledge will come but it will come slowly and, more worryingly, it is unlikely to keep pace with developments in basic science, such as an improved understanding of how the virus destroys the immune system. Cost is also an unresolved issue. A three-drug regimen including a protease inhibitor could cost each patient up to $12,000 per year, well out of the reach of many people in the US, let alone those in Africa or Asia.

Aside from programs to educate people about limiting their risk of exposure to HIV and to develop new drugs, the search for vaccines to prevent either infection or disease is also part of national AIDS strategies. Early predictions about developing an antiviral vaccine were hopelessly over-optimistic. In April 1984, when Margaret Heckler, then US Secretary of Health and Human Services, and Robert Gallo announced at a press conference that HIV was the "probable cause of AIDS," she predicted a vaccine within two years. Peter Duesberg is scornful of the notion that a vaccine will have any benefit: "The [HIV] hypothesis has failed to generate the promised vaccine" and anyway "vaccination is not likely to benefit virus carriers with or without AIDS."

Duesberg is correct in pointing to the failure to produce a vaccine. But he and many other researchers also failed to predict the huge difficulties that face vaccine designers. Since there are few people with HIV infection who have been able to control the progress of their disease, there are no clear indications about what factors might influence protection against illness. Moreover, there have been many impediments to vaccine development. They include the high degree of variation in the structure of HIV; the latent infection within infected cells; the lack of a suitable animal model to investi-


\textsuperscript{16}These new agents fall into several categories: RT inhibitors (AZT, zalcitabine, didanosine, 3TC, d4T, nevirapine); protease and integrase inhibitors; Tat, Rev, and Nef antagonists; and various candidate gene therapies.

\textsuperscript{17}One promising shortcut to defining drug efficacy is to measure the amount of HIV in the blood (viral load). The branched DNA test does this, is more accurate than CD4 count and can estimate the course of disease for up to ten years, or so it is claimed. This test might offer the possibility of accurately "staging" patients in a range of high to low risk categories, each of which may be studied or managed differently. See David Brown, "Better gauge of AIDS virus reported," The Washington Post, January 31, 1996, p. A3.
gate candidate vaccines, and the transmission of the virus mainly across vulnerable tissues—for example, the vagina and rectum. By striking contrast, successful vaccines to date have been developed for infections where integration into the genome is unusual and structural variation in the virus is limited. HIV does not play by the old rules. Despite these serious difficulties, several candidate vaccines are under investigation, though the initial studies have been disappointing.

Duesberg also fails to acknowledge the important safety and ethical issues underlying vaccine development. Many of the most effective vaccines are preparations of inactivated whole viruses or live, attenuated viruses. The risk from introducing viable HIV into uninfected people, thereby producing a potentially terminal infection, or enabling transmission of a potentially virulent virus particle to a partner, are obvious concerns.

The obstacles to developing new treatments and ascertaining the precise mechanisms by which HIV damages the immune system have had profound effects on AIDS research in the US. For instance, the fifteen-member National Task Force on AIDS Drug Development, launched with government fanfare in 1993 by Donna Shalala, the Secretary of Health and Human Services, was recently disbanded owing to lack of progress. The $1.4 billion US AIDS budget is undergoing careful review: it is projected to increase by only 1.6 percent in 1997, according to the President’s latest research and development budget. And the organization of AIDS research has recently been subjected to critical

scrutiny by a congressionally mandated review panel chaired by Arnold Levine from Princeton. A consistent message running though his report is that HIV research, especially vaccine development, needs to be freed from the “impediment” of the NIH establishment. What is needed, according to the panel, is a climate in which more innovative and imaginative lines of investigation can be pursued. A plausible example of what the committee had in mind might be an inquiry into the interaction between viral particles and potential cofactors, such as drugs.

5.

The standoff between Duesberg and the AIDS establishment has become increasingly embittered and ugly. The professional science journals, such as Nature and Science, which represent the majority opinion of researchers, have displayed an alarmingly uneven attitude during this dispute. Nature’s former editor, John Maddox, in 1993 denied Duesberg the right of reply to a paper purportedly showing that AIDS was not linked to drug use.

The truth is that a person’s “right of reply” may conflict with a journal’s obligations to its readers to provide them with authentic information. Whatever Duesberg’s friends say, the right of reply must be modulated by its content.

Two years later, Maddox relented—at least in principle. By then, he was forced to admit that Duesberg had drawn important and correct conclusions about the paradoxes of linking HIV to AIDS. With the publication of new evidence that addressed many of these paradoxes, he could no longer deny Duesberg a voice in his journal. The details of the exchange between Maddox and Duesberg are recounted

in documents published in both Infectious AIDS and AIDS: Virus- or Drug Induced? Duesberg’s response to new evidence describing early and dramatic viral replication after infection was a long rebuttal paper that was accepted in principle—“We shall publish the essence of what you have to say”—but deemed too long by Maddox, who offered Duesberg 500 words to make his case. Duesberg wrote a letter of complaint, which was published, but he was denied a full opportunity to counter the new data despite Maddox’s initial open invitation without strings attached. Other journals, admittedly less prominent than Nature, have adopted a very different approach, their editors believing that dissent is a sign of healthy and vigorous scientific debate. For example, the editor of the American Journal of Continuing Education in Nursing chose to give space to Duesberg on the grounds that “we are in the middle of a major scientific controversy about the treatment of AIDS.”

Parts of the lay press have also adopted a highly partisan position in the Duesberg controversy. In the UK, Rupert Murdoch’s The Sunday Times took a wholly uncritical pro-Duesberg position during the early 1990s, much to the irritation of John Maddox. And Simon Watney, director of a UK AIDS charity, writes,

20The recent observation that a chimpanzee has developed AIDS ten years after being inoculated with HIV raises the prospect that vaccines may be testable in laboratory animal models. See Lawrence K. Altman, “Infected with human virus, a chimpanzee develops AIDS,” The New York Times, January 31, 1996, p. A14.

21The US, by contrast with WHO, recommended against proceeding with gp120 vaccine trials. This vaccine will now be developed in a new initiative by its manufacturer, Genentech. Another company, MicroGeneSys, has recently announced that its trial of a gp160 vaccine in HIV-infected individuals has shown no significant effect on disease progression despite up to 30 injections over a five-year period. Results from a two-year Canadian study have confirmed this finding.


24Maddox wrote, somewhat tendentiously, that Duesberg’s reply will be eagerly awaited and will be published with the usual provisos—that it is not libelous or needlessly rude, that it pertains to the new results and that it should not be longer than it needs to be.”


May 23, 1996

Duesberg is able to pass himself off as a beleaguered, isolated radical, struggling against a monolithic scientific establishment that refuses to listen. The truth is quite the reverse. Duesberg has had vast amounts of media coverage, largely because the mass media is only too happy to promote the view that AIDS is caused by deviant lifestyles rather than an infectious agent. 26

June Osborn, a former chairperson of the US National Commission on AIDS, comments that “for the thousands who are suffering from AIDS or trying to cope with the escalating demands of treating this deadly illness, Mr. Duesberg’s suggestion that nothing new is happening is as outrageous as it is insulting.” 27 Scientists have expressed not entirely unjustified anxiety that a free and open debate about the cause of AIDS might dilute the public messages concerning safer sex and needle exchange programs.

But there seem other reasons for the science establishment’s wish to gag Duesberg and to deny him opportunities to conduct research. Elinor Burkett, in her polemic The Gravest Show on Earth, comments that dissidents insist that the HIV-as-the-sole-cause-of-AIDS crowd has no choice but to call them names because leading proponents are so enmeshed in their dogma—professionally, emotionally and financially—that they cannot allow any honest discourse. 28

She continues, “The scientists involved have been guided by the same force that has driven research into every other public health concern, from heart disease to cancer: the bottom line.” In 1984, when Samuel Broder, the recently retired director of the National Cancer Institute, wanted to find potential drugs to combat HIV, he turned to the pharmaceutical industry. He soon persuaded Burroughs-Wellcome to look again at AZT, a cancer treatment that had been discarded because it was too toxic. By 1987, the American researcher Margaret Fischl had published her landmark paper on the efficacy of AZT. In 1989, early reports suggesting AZT’s success in treating patients who did not yet have AIDS symptoms led Burroughs-Wellcome stock to rise by 33 percent. Burkett chronicles in almost obsessive detail the “gravy train” that has become AIDS, Inc.

I remember clearly the press conference called by the Wellcome Institute in London at the time of the Concorde study’s publication. The gathering was not intended, as one might imagine, to explain to medical journalists the intricacies of the research and how it might be interpreted. The room was, instead, packed with financial journalists who were there to hear of the resolve of the company officials to destroy the credibility of a new study that they had helped to design and analyze, but which had gone against their product.

Apparently under pressure from the company, two coauthors of the study withdrew their support from the clear implication of the trial that AZT was ineffective in otherwise healthy HIV-positive individuals. At the same time, in the final trial report published in The Lancet, it was noted that “representatives of the Wellcome Foundation, who were also members of the Coordinating Committee, declined to endorse this report.” 29 If the latest crop of new drugs—the protease inhibitors—proves successful, both Merck and Abbott would each earn from their products several hundred million dollars in the US alone. An open debate with Duesberg could have grave commercial consequences.

The Duesberg controversy also reflects a deep philosophical division within biomedicine, the recent historical roots of which have been underlined by J. Rosser Matthews in his 1995 account of the evolution of medical statistics and the clinical trial during the past two centuries. 30 Two traditions have consistently fought for epistemological authority in medicine: one with roots in the basic laboratory clinical sciences—biochemistry, physiology, molecular biology—and another, broadly falling under the heading of epidemiology, which relies on surveys of disease in populations of actual patients. Duesberg shows his skepticism, as an unapologetic empiricist, at the statistical manipulations and, he would say, falsehoods that emerge from epidemiological research supporting the notion that HIV is the cause of AIDS.

The intellectual lineage of Duesberg’s view can be traced back to the early part of the twentieth century and the birth of medical statistics as an independent discipline. For example, Matthews quotes the scientific writer W. P. Harvey in 1909:

Much misunderstanding seems to exist as to the relationship which should hold between the statistician, anxious to scrutinise the validity of inferences drawn from observations; and the observer of the facts. The latter looks with suspicion on the former and is inclined to doubt whether the intrusion of his fellow scientist into his domain is for any more worthy purpose than simply to show that he is totally wrong in his conclusions.

This can be read as an uncannily precise summary of Duesberg’s position.

30 See J. Rosser Matthews, Quantification and the Quest for Medical Certainty (Princeton University Press, 1995).
as an “observer of the facts.” Duesberg has centered his life’s work on studying retroviruses, which he concludes are harmless, and he is now being asked to accept a view by scientist-statisticians who do not, in his view, understand his “domain.” For Duesberg laboratory-based experimentation must take precedence as the foundation for scientific reasoning, while others are content to rely on epidemiological correlations. NIH has traditionally favored laboratory work, but it has come under sustained attack in recent years for its bias against research based on patients.3 The debate remains an active one. Matthews emphasizes this dichotomy by asking,

Do medicine’s “scientific” credentials derive from the use of laboratory techniques in such fields as physiology or bacteriology, or from more novel techniques of mathematical statistical inference as used in epidemiology?

This debate rages now in the highly polarized discussions over the validity of evidence on which clinical decisions are to be based.3 Duesberg’s dispute with the AIDS establishment is one extreme example of this deepening rift within biomedicine.

Yet another part of the current medical landscape that the Duesberg affair illuminates is political and ideological. What does the orthodox scientific establishment do to a scientist whose work and views are out of step with majority opinion? Apparently, in some cases, cut off his funding.

The prevailing “peer pressure of scientific consensus,” as Duesberg characterizes it, strangles scientific innovation. The usual, and much vaunted, process of peer review can be crippling. “Under this review system,” Duesberg writes, “a scientist’s access to funding, promotions, publication in journals, ability to win prizes, and invitations to conferences are entirely controlled by his peers.” As a result, “few scientists are any longer willing to question, even privately, the consensus views in any field.” An editorial in Nature argued that

there may come a point at which dissenters forfeit the right to make claims on other peoples’ time and trouble by the poverty of their arguments and the exasperation they have caused.3

And this view is confirmed by US government officials. Donna Shalala has written that “to deviate funds from scientifically sound findings to those that lack evidence would be unconscionable.”

One of the most disturbing aspects of the dispute between Duesberg and the AIDS establishment is the way in which Duesberg has been denied the opportunity to test his hypothesis. In a discipline governed by empirical claims to truth, experimental evidence would seem the obvious way to confirm or refute Duesberg’s claims. But Duesberg has found the doors of the scientific establishment closed to his frequent calls for tests. To begin with, the grant he was awarded in 1985 to support his work on cancer was not renewed despite an appeal supported by the administration of the University of California at Berkeley. The experimental virology study section of NIH wrote that Duesberg was an “applicant whose productivity has recently diminished both in quantity and most disturbingly in quality.” Between May 1993 and December 1994, six further grants to Duesberg to fund cancer research were rejected. In AIDS research, between February 1993 and August 1994, Duesberg tried to secure funding to investigate his hypothesis (which has with time hardened into more of a belief) that nitrite inhalants are a cause of AIDS. These applications were made to the university-wide AIDS Research Program at the University of California and twice to the National Institute of Drug Abuse. His two grant applications to NIDA—both entitled “Animal tests of the AIDS risks of nitrite inhalants”—were supported by letters from Daniel E. Kosland, then editor of Science. All three applications were rejected, and the validity of his hypothesis still remains unknown.

This issue is examined in detail by Serge Lang of the Department of Mathematics at Yale in AIDS: Virus or Drug Induced? His review of the NIDA grant applications is revealing. Duesberg set out his objectives very clearly without much of the exaggeration that pervades his other writing. For example,

The proposed research would clarify whether immunosuppression and/or Kaposi’s sarcoma can result from long-term exposure to nitrite inhalants. Public health efforts aimed at AIDS prevention might increase their effectiveness by discouraging the recreational use of nitrites and other psychoactive drugs, thereby lowering the AIDS risk even of those already infected with HIV.

In a letter dated August 26, 1993, Daniel Kosland wrote:

Given the critical information that would be generated by such a study, regardless of its outcome, I believe the time has come for this experiment to be performed.

Although NIDA rejected the application, Lang pursued the issue with Science by inviting a member of its staff, Jon Cohen, to consider writing a story about Duesberg’s failure to get funded, especially in view of the involvement of Science’s editor. Cohen sent the Duesberg proposal to six researchers. After making several criticisms, one wrote that “I think a version of the grant could well be fundable.” A second reviewer con-

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cluded that “the overall content is very meagre.” A third referee commented that he “would not have gone that far,” i.e., he would not have rejected the proposal so unequivocally. Following the suggestion of the first reviewer, Duesberg submitted a revised application. That, too, was rejected, despite Robert Gallo’s support of Duesberg’s proposal, subject to a satisfactorily detailed application being submitted. Lang’s point is that there has been consistent resistance to fund Duesberg’s research proposal. In *Inventing the AIDS Virus*, Duesberg also points to what he considers censorship and biased coverage in newspapers and television and in professional journals. Recent congressional interest might reverse this trend.34

Although an overwhelming body of evidence exists to confirm the causal association between HIV and AIDS, the principle that original experimental investigation should be given primary importance in science, recently emphasized by the Levine committee, supports the argument that proposals made by serious scientists with proven records of high-quality research deserve careful consideration. This is especially the case in view of the current widely acknowledged uncertainty about the origins and mechanisms of HIV disease. It is not only Duesberg who points to this uncertainty. Michael Ascher and his colleagues at Berkeley wrote in 1995 that those who would see AIDS as a more-or-less conventional viral infection have consistently refused to recognize the paradoxes that are clearly evident in the experimental data—the problem continues.35

And Jon Cohen commented in *Science* that no treatment, to date, has had much success. And unless that bleak reality changes, alternative thinkers will likely keep needling their establishment colleagues and urging them to rethink their basic understanding of the disease.36

But how far will this rethinking be allowed to proceed? Duesberg, for his part, not only fails to understand the strengths and weaknesses of the epidemiological method; he also, as has been seen, recklessly deploys ill-thought-out epidemiological arguments to support his own drug-AIDS point of view. Nevertheless, as a retrovirologist, Duesberg deserves to be heard, and the ideological assassination that he has undergone will remain an embarrassing testament to the reactionary tendencies of modern science. Irrespective of one’s views about the validity of some of Duesberg’s arguments, one is forced to ask: At a time when fresh ideas and new paths of investigation are so desperately being sought, how can the AIDS community afford not to fund Duesberg’s research?

34On March 24, 1995, freshman Representative Gil Gutknecht, a Minnesota Republican, invited Donna Shalala to respond to questions about the virus-AIDS hypothesis. Although Shalala replied on July 10, 1995, continued political oversight of the HIV research program is bound to lead to repeated challenges to scientists to question their assumptions further.


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