

PETER'S PRINCIPLES

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PHOTOGRAPHY BY HOWARD CAO



Under a brilliant early-morning sky in Berkeley, California, Peter Duesberg pushes his bicycle along Oxford Street while animatedly explaining his new theory of cancer—oblivious to the fact that he is about to walk in front of a car. A professor of molecular and cell biology at the University of California at Berkeley, the 71-year-old Duesberg could pass for a younger man. He is slender, with white hair and strong features, and today he is wearing a black leather jacket over a button-down shirt. Cancer is an old passion, a topic he has been researching for more than 40 years. Now his radical theory on the origins of the disease is finally winning serious attention.

He is so absorbed in conversation that only as disaster is about to strike does he look up to see the car bearing down on him. Duesberg giggles as if enjoying a private joke and steps back to the curb, pulling his bike with him. But even before he reaches the safety of the sidewalk, he has resumed his explanation of aneuploidy, the basis of his theory about the cause of cancer.

Duesberg is no stranger to controversy—or oncoming traffic. On March 1, 1987, he published

Peter Duesberg went from acclaimed molecular biologist to bad boy of science. What happened? And can he come back?

a paper in *Cancer Research* questioning the role of HIV in causing AIDS. The paper became the line in the sand, the demarcation between Duesberg the golden boy of biology—part of the team that first mapped the genetic structure of retroviruses, codiscoverer of the first viral cancer gene in 1970, clever critic—and Duesberg the demon. For 23 years before the publication of that paper, Duesberg says, he never had an application for public funding of his research turned down. In 1986, at age 49, he was elected to the National Academy of Sciences. That same year he was given a National Institutes of Health Outstanding Investigator Award, one of the most prestigious and coveted grants. Robert Gallo, codiscoverer of HIV and a former friend of Duesberg's, praised him in 1985 as a "man of extraordinary energy, unusual honesty, enormous sense of humor, and a rare critical sense." He added, "This critical sense often makes us look twice, then a third time, at a conclusion many of us believed to be foregone."

Since the 1987 article on HIV, Duesberg has become a pariah among scientists. More than 20





of his grant proposals for government funding have been turned down. AIDS activists have denounced him in public protests and media campaigns. Friends, Gallo among them, have abandoned him. His laboratory, once staffed by two secretaries and numerous graduate students and postdocs, is now occupied by only Duesberg himself and one graduate student—although undergraduates do circulate in and out. He has no secretary. His wife, who pinch-hits as an assistant, talks in a whisper about the pain of his exclusion from the rest of academia, social events, and a normal life. Otherwise mild-mannered scientists known for choosing their words carefully, who might once have called Duesberg the Einstein of biology, now spew vitriol at him, making hurtful comments that he claims roll right off him. In a pointed reference to those who say the Holocaust never occurred, he and others who challenge the prevailing understanding that HIV is the cause of AIDS have been labeled “denialists.”

The label is not without irony. Duesberg was born in Münster, Germany, in 1936 to physician parents; his mother was an ophthalmologist and his father a renowned and groundbreaking internist. Despite the war that would soon be raging in Europe, Duesberg describes his childhood as oddly idyllic, a time when he delighted in play and small pranks. As an altar boy given the task of carrying the thurible filled with burning incense during Catholic services, Duesberg discovered the fun of swinging it faster than necessary, creating plumes of smoke that caused parishioners to cough and choke. It was a source of hilarity for him and the other altar boys, and when the priests scolded them, it only added to the fun. He enjoyed summers at Lake Constance on the border Germany shares with Austria and Switzerland, where he swam, bicycled, and

played games with other children “like there was no tomorrow.”

Duesberg insists he was shielded from the war. Yet it was far from invisible, even in the small towns where he lived and played. “I still remember...these speeches on the radio,” he says. “We were supposed to believe in the Final Victory.” His teacher, who wore a swastika on his jacket, told the class that the Reich would win the war with *Wunderwaffe*—literally, “wonder weapons.”

“We were too young to take it terribly seriously,” Duesberg says, adding that the sound of sirens warning of incoming bombers evoked a boyish sense of excitement. “We would go look at the bombs and collect fragments,” he says. But on December 25, 1944, when the sirens sounded and the Duesbergs hunkered down in a makeshift bomb shelter, the family home at 11a Heinrichstrasse in Kreuznach, near Frankfurt, was bombed. Only in a later conversation does Duesberg admit that even today the sirens of fire engines or ambulances in the streets of Berkeley provoke in him a primitive fear reflex—a lasting effect of the war years.

Duesberg’s parents, both intellectuals who held politics in contempt, were unable or unwilling to openly confront the Nazi threat. In an attempt to evade pressure to join the Nazi Party, Duesberg’s father volunteered for the army. After serving as a doctor in Russia, he was captured by British soldiers in Belgium and held as a prisoner of war for a year in England before being released and returned to Germany in 1946. Duesberg’s parents separated shortly after the war.

Duesberg is self-conscious about his heritage, and it is perhaps inescapable that the war and his father’s role in the German army would have fueled some of this. These factors may also have planted the seeds of a complicated, disquieting side of him that persists to this day. When asked about his father, Duesberg is remarkably restrained, even evasive. He shrugs off questions, his face betraying neither affection nor anger. When asked about his father’s seminal contribution to the understanding of cardiovascular shock, the accomplished son demurs, saying, “I don’t really know what his theory of shock is.”

As it did with his father, though, science would define Duesberg’s life. The postwar years led to “an enormous upswing in science,” he says. The discovery of polymers, or repeating chains of proteins, opened up expanses of research. “This is when insulin was sequenced,” he says. “It’s what kids in high school talked about.” At first Duesberg’s interest was in chemical rather than biological polymers. The possibilities for new inventions were seemingly limitless. However, after he earned his Ph.D. in chemistry from the University of Frankfurt in 1963, one of his professors, Theodore Wieland, told him that the most important and exciting work was in the hunt for the viruses thought to cause cancer. Duesberg remembers Wieland’s advising him: “Go west, young man. Go west.” Duesberg, thinking it would make him “rich and famous,” decided to take his professor’s advice and move to the United States.

Over the next four decades, Duesberg would throw himself into his passion for science, traveling thousands of miles from his homeland. Even so, he still peppers his conversations, no matter the topic, with World War II metaphors and references to Hitler and his henchmen—and to the “good Germans” who did as the government demanded. It is hard to understand him at times, not just because of his sharp German accent and odd phrasings but because he makes mental leaps that can leave a listener exhausted. In rapid-fire sequence he jumps from scientific minutiae to grand political comparisons (viruses, bacteria, oncogenes, even research-

ers who study these entities can be transformed into Goebbels or “good Germans”), and then he might toss in an entirely new idea before returning to his original topic—all within seconds.

In 1964 Duesberg arrived at Berkeley as a postdoctoral fellow hoping to unlock the secrets of cancer. He recently walked along the long, easy pathways of the university recalling the excitement of his early cancer research and how he had joined in the hunt for retroviruses. At the time, most researchers thought virtually all cancers were caused by viruses. Retroviruses were considered the likely culprits since they could cause cells to go into overdrive. By inserting their genetic material into the host’s genome, they triggered cell proliferation and sometimes tumor formation. In 1911 Peyton Rous demonstrated that one retrovirus, now called Rous sarcoma virus (RSV), could produce tumors when injected into healthy chickens. In 1970 Duesberg, along with a colleague, Peter Vogt, isolated the RSV gene responsible for causing those tumors—the *SRC* gene. This was the first cancer gene, or oncogene, ever identified—a celebrated breakthrough that truly put the young German on the scientific map. Following up on this, Harold Varmus and J. Michael Bishop discovered the homologous *SRC* gene in normal human cells in 1976, for which they later received the Nobel Prize. It was thought that the human, or “cellular,” *SRC* gene, after undergoing a mutation, would trigger cancer. This launched a new era in cancer research and a mad dash to identify cancer genes, the little time bombs said to exist on otherwise normal strands of DNA, which one researcher dubbed “the enemy within.”

Rather than bask in the glory of having been first to isolate the oncogene, Duesberg began to doubt that the enemy really was within. He started to suspect that oncogenes do not cause cancer. To prove that they do, Duesberg says, researchers should be able to create cancer in cell cultures by inserting human cancer genes into human cells. But after two decades, millions of dollars of public and private funding, and the best efforts of cancer researchers, himself included, Duesberg says that no combination of genes has ever produced cancer in tissue cultures.

This is a point strongly repudiated by a number of well-respected cancer researchers, such as Robert Weinberg of the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts. Weinberg, who is also a professor of biology at MIT, says he has created cancer cells in culture by adding oncogenes—as, he stresses, have hundreds of others. “It is not a point of contest,” Weinberg says. “It is as debatable as whether day follows night or 3 follows 2”—that is, not debatable at all. But Duesberg insists Weinberg’s experiments were not correctly interpreted; the chromosomal defects seen in those experiments, he now says, were the cause, not the result, of the cancer.

Despite Duesberg’s groundbreaking work, his accolades, and his federal grants (which continued through the mid-1980s), once he began to question the widely accepted role of oncogenes as the cause of cancer, his colleagues began to give him the cold shoulder.

The evidence of their disdain was embarrassingly public. Around 1984, when a student of his pointed out that Duesberg had not attended a West Coast meeting of scientists working on tumor viruses, he suddenly realized that he was no longer being invited to the informal meetings. For 12 years Duesberg had regularly met with his colleagues, including Peter Vogt and Nobel laureates Varmus and Bishop, among others. “We had vigorous debates,” Duesberg says. “But I thought that was good science. You challenge ideas. I thought it was all in good spirit.” Other researchers didn’t see it that way. Duesberg’s constant natter about problems with oncogenes as the cause of cancer seemed to them a distraction, even an obstruction. So they simply stopped inviting him to meetings. They failed to respond to his letters and calls. They no longer welcomed him to stay in their homes during out-of-town conferences, as they had in the past.

Weinberg, who first met Duesberg in the 1970s, calls him a “contrarian” with a “corrosive and acidic wit.” He feels that it was these traits, more so than science, that later guided Duesberg’s decision to challenge the theory of HIV. “He is like a man who is shipwrecked on an island, struggles onto the beach, looks around, and says: ‘Is there a government here? If so, I’m against it.’”

In 1984, while Duesberg was researching cellular and viral oncogenes, he heard Margaret Heckler, who was Secretary of Health and Human Services, announce that his then friend Robert Gallo had discovered that HIV was the cause of the mysterious new plague known as AIDS. Duesberg was instantly suspicious. He knew that HIV is a retrovirus—the subject of his own heralded research—and that retroviruses don’t kill the host cells they infect. If anything, they make them proliferate. That is the opposite of what happens with AIDS, where special immune cells known as CD4 cells are knocked off. The more Duesberg looked for answers, the more he came to believe that the original hypothesis of top AIDS researchers was actually correct: The disease was—at least in the United States—brought on by drug use and other immune-suppressing causes.

Inside his large, bustling laboratory in Berkeley’s famous Stanley Hall, Duesberg plotted out graphs of the 1960s and ’70s epidemic of drug abuse, including busts for heroin, cocaine, and other drugs. Then he superimposed them on other graphs illustrating the rise of AIDS. Allowing for a time separation of a decade or less, he found a close correlation between the two groups of graphs. Although there was nothing new about drug abuse, it appeared there was something new about the intensity of use and the types of drugs used, particularly among gay men.

Duesberg likens the problem to smoking: If you smoke a few cigarettes, even over a decade, your chance of lung cancer might remain fairly low, but smoke several packs a day over several decades and your risk soars. Research by numerous investigators showed that most of the gay men who first developed AIDS had a long history of drug abuse that often included “poppers,” a nitrite drug that treats heart disease. Poppers were widely used not only to get high but also to relax

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—Peter Duesberg



the anal muscles to make sexual intercourse easier. According to several research accounts, a number of the men were having multiple daily sexual encounters that could easily translate into hundreds of partners over a lifetime. Since nitrites are powerful carcinogens, Duesberg thought this explained why gay men frequently developed the cancer Kaposi's sarcoma but other risk groups, such as hemophiliacs and heterosexual drug abusers, rarely did. The eventual decline in Kaposi's, he now says, was due to a decline in the use of poppers—a position bolstered by a study that found that mice briefly exposed to poppers developed signs of reduced immune function.

In 1986, after more than two years of research, Duesberg was so convinced that the HIV theory of AIDS was dead wrong that he spent nine months writing his paper on HIV for *Cancer Research*.

The reaction was explosive. Both Duesberg and his hypothesis were roundly condemned by the overwhelming majority of AIDS researchers, many of whom had been his friends. Max Essex, a professor of infectious diseases at Harvard University and one of the first to suspect that HIV was the cause of AIDS, had met Duesberg in the mid-1970s; he says Duesberg was always fun and that "everyone wanted to go for drinks with him." Today Essex dismisses Duesberg as a crank whose sarcasm has grown meaner over time. "Everyone," he says of the many who abandoned Duesberg, "thought he was someone to stay away from because he was such a loose cannon who didn't think before he spoke."

Duesberg says his critics have failed to provide satisfactory answers to perplexing contradictions about AIDS. For example, he

asks, why does Kaposi's sarcoma, a cancer of the blood vessels, occur almost exclusively in gay males and not in heterosexual drug users? Why is AIDS rarely transmitted by heterosexual contact in Europe but is said to spread rapidly among heterosexuals in Africa? If AIDS is caused by a virus, why has it been impossible for researchers to develop a vaccine after 20 years and millions of dollars spent? Finally, could it be, as Duesberg suggests, that antiretroviral (ARV) drugs used to attack HIV actually do more harm than good, contrary to the common assumption that they have dramatically reduced AIDS deaths?

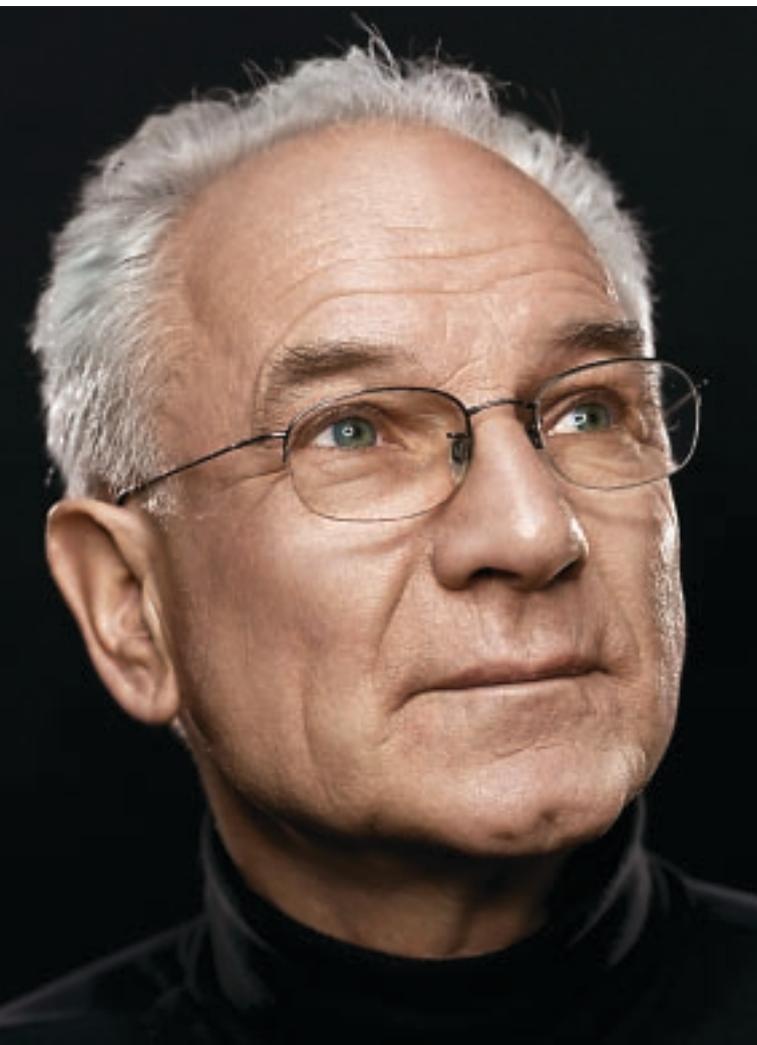
Genial and soft-spoken, Essex shoots down Duesberg's ideas about ARVs by saying: "There are now 15 or 20 different drugs that act in 8 or 10 different ways, and the only thing they have in common is that they inhibit the virus from replicating and lower the viral load to negligible levels. If you include three of them at once...as soon as that happens, the immune system recovers."

For the stances he has taken, Duesberg has faced such ferocious personal and professional attacks that in 1996 Richard Horton, editor of the British medical journal *The Lancet* and himself a critic of Duesberg, broke ranks and wrote in *The New York Review of Books*: "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?"

Sitting in the small, cramped laboratory to which he has been relocated in Berkeley's Donner Hall, Duesberg surprises this writer when he observes, "Scientific isolation has its advantages." In the years since he took his stance on HIV, he has seen his resources dwindle, but he has also been cut loose from the strings that come with public funding. "I was free to pursue things the way I saw them," Duesberg says. Sitting amid floor-to-ceiling shelves overflowing with papers, boxes of journals, and textbooks on oncology, AIDS, medical virology, biochemistry, and immunology, Duesberg responds to a question about one book, *Thou Shalt Not Think: The Brutally Frank Guide to Life* by David Jack. "The author sent that to me," he says of the book, which explains how orthodox thinking is enforced. "We're supposed to be 'good soldiers' following orders from the higher-ups," he adds disdainfully.

In the late 1980s, while continuing to defend his stance on HIV, Duesberg threw himself back into his original work: trying to solve the puzzle of cancer. If bad genes weren't the cause of cancer, what, then, was causing cells to run so horribly amok? Searching for clues in the scientific literature, he came across the forgotten work of Theodor Boveri. In 1914 Boveri observed that sea urchin embryos with abnormal amounts of chromosomal material, a condition called aneuploidy, looked cancerous. After continued study, Boveri surmised that aneuploidy could cause cancer.

Duesberg found Boveri's observations intriguing. Gene mutations were far less likely to create the kind of havoc that deranged chromosomes containing thousands of genes could cause. Genetic mutations, whether inherited or acquired, Duesberg says, are akin to removing one or two workers on an auto assembly line; cars would still be produced with virtually no flaws. But damage to an entire chromosome, he says, is like removing an entire section of an assembly line and plunking it down where it shouldn't be. Sud-



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—Max Essex

denly cars would be produced with two engines or no engine at all—or with a carburetor where the exhaust system should be.

Having no money, no support, and no staff in 1996, Duesberg placed a call to his old friend and colleague Ruediger Hehlmann, a highly respected professor of medicine at the University of Heidelberg in Mannheim, Germany. Recently Hehlmann, wearing a full-length lab coat over a dark blue suit in his meticulously neat office, discussed Duesberg and his many successes. Hehlmann is a strong supporter of his friend’s cancer research, calling him the “father of oncogenes” and a ge-

nus in the field. But when the subject of AIDS comes up, his face clouds over. “I think he’s wrong. That’s what I think, and I tell him.”

Even so, Hehlmann approached the medical school’s dean for money to fund a professorship. The dean, who had known and admired Duesberg’s father, responded enthusiastically, saying: “Oh, that’s the son! OK. We’ll take him.” Since his appointment at the University of Heidelberg in 1997, Duesberg has spent each of the last 10 summers in Mannheim down the hall from Hehlmann, conducting experiments in cancer and aneuploidy. Mannheim, which sits at the junction of the Rhine and Neckar rivers, its cobblestone streets lined with upscale shops and outdoor cafés, provides a quiet workplace and sanctuary for Duesberg during these summers. It is here that he has refined his theory of aneuploidy as the cause of cancer.

It was also in Germany, in 1993, that Duesberg met his future wife, Sigrid Sachs. An attractive blonde with sky-blue eyes, Sigg, as everyone knows her, was smitten with Duesberg right away. “It was nice from the beginning,” she says. “I liked his sarcasm, and he was different—very funny and intelligent.” The two met at a conference in Bonn that Sigg helped organize and to which Duesberg had been invited to speak, along with his nemesis Robert Gallo.

When Duesberg arrived at the registration desk manned by Sigg, he saw an opportunity for mischief. He had overheard that Gallo had cancelled at the last minute, so when she asked his name, he boldly announced, “I’m Dr. Gallo!” The joke was up within minutes, but both Duesberg and Sachs enjoyed the prank, and it became a running gag between the two. Shortly after the conference, she resigned her position to move to Berkeley, where she now organizes Duesberg’s research data and his conferences on cancer and aneuploidy.

Cancer, according to Duesberg’s theory, occurs when chromosomes fail to divide properly. During cell division, or mitosis, the 23 pairs of chromosomes must line up and divide perfectly to yield 46 individual chromosomes, with exactly half—one chromosome from each pair—going to each of two daughter cells. Sometimes the division is faulty and the pairs rip apart eccentrically, like a paper towel that fails to tear along the perforation. The separation gives too much chromosomal material to one daughter cell and shortchanges the other. This aneuploidy, or unequal distribution of chromosomes, is often fatal to the cells. But in some instances the aneuploidic cells survive. Then, like a top spinning out of control, each new cell division can cause

more bizarre changes in the chromosomes. Lacking the correct blueprint for growth, the process produces cells that are increasingly unrecognizable. They are neither liver nor nose, breast nor testicle. Nor are they confined to the organ in which they originated. They are cancer, a cluster of cells that grow without regard for what they should be and how they should behave.

Duesberg’s theory on cancer has triggered almost as violent a reaction in some quarters as did his assertion that HIV doesn’t cause AIDS. Several researchers interviewed, after asking to go off the record, erupted in venomous attacks on Duesberg, saying that aneuploidy is the result of cancer, not the cause. But recently a number of mainstream scientists have come around, agreeing that aneuploidy may play a role (even if not an exclusive one) in cancer. In 2005 Duesberg was invited by the National Institutes of Health—which had long since dismissed him and his research—to give a grand rounds presentation on his aneuploidy work. Other researchers, such as Thomas Ried of the National Cancer Institute, are conducting their own studies and joining Duesberg at international conferences on the subject. Several scientific journals have even published Duesberg’s writings on the topic, including, in 2007, *Scientific American*. Editors there, wary of Duesberg’s reputation, ran a lengthy editorial entitled “When Pariahs Have Good Ideas,” explaining their reasons for choosing to publish his paper. They wrote, “To dismiss a scientist solely for holding some wrong or controversial views risks sweeping away valuable nuggets of truth.”

Despite the 1996 call by *The Lancet’s* editor to fund Duesberg’s research on AIDS, and despite *Scientific American’s* plea more than a decade later that the scientific community consider his theories on cancer, Peter Duesberg is still fighting daunting scientific battles. And he is doing so with meager funding and only a small band of supporters. One, Christian Fiala, an obstetrician and gynecologist based in Vienna, says Duesberg “is obviously following a rational and evidence-based thinking and argues accordingly.” Fiala first doubted that HIV was the cause of AIDS when experts warned that the disease was set to spread beyond the known risk groups—gay men, intravenous drug users, and hemophiliacs. That didn’t make sense to him. Diseases that are confined to risk groups stay confined to risk groups, he says, unless there is some major event like the organism’s mutating into some new, more highly virulent form of disease, and there was no evidence of that.

Fiala cautions against writing off researchers like Duesberg, saying there is a history of dissenters’ being right. “They persecuted Semmelweis, too,” Fiala says of the famed 19th-century Hungarian who practiced medicine in Vienna. Although that city now has a hospital named in honor of Ignaz Semmelweis, Fiala recounts how the physician was pilloried, fired from his job, and banned from the city for his suggestion that doctors were largely to blame for the deaths of many thousands of women during the 1800s from “childbed fever,” an infection of the uterus that occurred shortly after birth. It was a number of years and many more deaths before doctors realized that Semmelweis was right: Doctors were infecting women during childbirth. Childbed deaths fell to one-tenth their previous level when doctors followed Semmelweis’s admonition to wash their hands.

Another parallel with Semmelweis may be more instructive. Historians have suggested that Semmelweis was his own worst enemy—that he was obstinate and imperious, refusing to write

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up his findings. Had he been more politic, they say, perhaps his ideas would have been more carefully evaluated. The same may be true of Duesberg. Where Semmelweis wouldn't put pen to paper, Duesberg, many say, won't listen or shut up.

Although Duesberg can be remarkably charming, he can also be disturbingly crass. For example, he repeatedly refers to gay people as "homos" and blacks as "*Schwartzes*." In defending Nobel laureate James Watson's controversial remarks on race, he says: "Here you're supposed to be the honest scientist and base everything on evidence, and then you're supposed to say, OK, we're all the same and we feel equally sorry for some black in Africa [and] one relative here in Berkeley or friend in Berkeley or whoever it is. Obviously you don't."

Siggi Duesberg is well aware of the charges of racism that swirl around her husband. Duesberg's influence on President Thabo Mbeki of South Africa—who has cited his theories when denying the use of ARVs for HIV/AIDS patients in South Africa—makes Duesberg complicit, his critics charge, with a government policy re-

sponsible for what they call the "murder" of many Africans who have died without ARV treatment. Max Essex believes that history will judge Duesberg as either "a nut who is just a tease to the scientific community" or an "enabler to mass murder" for the deaths of many AIDS patients in Africa. Although Essex doesn't make the charge of racism, he says that Duesberg's claims must derive from some "ulterior motive or serious psychological blind spot."

Duesberg, for his part, does little to dispel the festering controversy. As his wife stands outside a Berkeley restaurant, she can't help but look exasperated and roll her eyes at his behavior, saying: "My husband has just a very bad mouth sometimes, and I tell him, 'Just keep your mouth shut. People who don't know you that well don't know your kind of humor sometimes.'" During a later phone call, she says, "He is not a racist." But she adds that the couple have had "lots of arguments" about the way he talks. Then she sighs and says: "I also realized that I cannot really change him. Nobody can change him."

The only refuge, besides Mannheim, from the controversies that dog Duesberg is within the four walls of his Berkeley lab. As he enters to conduct an undergraduate class, several students greet him with broad smiles. There is an air of industry as the students hold up pieces of paper and stare at them intently. They are performing Southern blot tests to detect the lambda viral genome they've inserted into the DNA of *Escherichia coli*. A few students approach Duesberg to ask advice about other projects. He gives each one his full attention.

Huddled in one corner of the lab amid microscopes, gas jets, and flasks, half a dozen students talk about their professor. One says Duesberg is one of the "most pro-student teachers on campus." The other students nod in agreement. "Other teachers hide from their students, but not Dr. Duesberg," another adds. "He's the best teacher here." When the students are asked what they think about the controversies surrounding their professor, their faces

go blank. It is obvious that they are unaware of the imbroglia surrounding him. Some of these members of the Peter Duesberg fan club were not even born when the controversy over AIDS and HIV hit its boiling point in the late 1980s and early 1990s. One student, uncertain about what is being asked, offers tentatively, "Almost all of our professors are famous."

Away from the students, Duesberg, his mind ever racing, explains how eager he is for studies that could prove or disprove his hypotheses about HIV—studies like treating mice or rats with poppers for extended periods to see if they develop AIDS and Kaposi's sarcoma. That's the sort of functional evidence that he says is sorely needed and not pursued by researchers today.

He also suggests tracking the health of applicants to the U.S. military—over the past 22 years, the military has tested millions of potential recruits for HIV. Some of those testing positive are being treated, and some are not. Duesberg says such a study would show "whether otherwise healthy people with HIV get AIDS-defining diseases above the norm for matched controls without HIV." If HIV is just a "harmless passen-

ger virus" as he believes, untreated HIV-positive individuals might be expected to do at least as well as, or better than, HIV-positive patients who take antiretroviral drugs.

Essex dismisses such a study, saying, "I think that would be totally unethical." Only when there is no existing treatment for a condition, Essex says, should a placebo or no medical intervention be allowed. "As soon as somebody said, OK, this drug does better than a placebo, then it would be the standard that you test the next drug against or a combination of drugs against. That's the first thing you learn in ethics...like doing the infamous syphilis experiment at Tuskegee. It's exactly like it. It's totally unethical."

Duesberg doesn't see anything wrong with studying untreated patients. "What's unethical about it?" he asks. "No one would be asked not to take drugs." A small contingent of scientists, including two Nobel laureates, agree with Duesberg and think it's unethical *not* to test his theories. Perhaps surprisingly, a number of people who have tested HIV-positive or even been diagnosed with AIDS also believe Duesberg is right. One, a 47-year-old gay man who lives in New York City, has been HIV-positive for 23 years and has never taken antiretroviral drugs. He believes they are "toxic," and he credits Duesberg with his survival. "I watched my friends take more and more drugs and get sicker and sicker," he says. ARVs, not HIV, he claims, are responsible for their deaths.

Right or wrong, for more than two decades Duesberg has surely paid a price for his beliefs. Even close friends have begged him to back off some of his statements, if only so he isn't targeted and shunned. Asked why he persists in raising questions about AIDS when it has resulted in financial losses, professional rejection, and social isolation for him and his family, Duesberg, pushing his bike along a walkway that winds its way through the lush grass and stately trees of the Berkeley campus, stops walking, thinks for a few moments, and says, "I don't want to be a 'good German.'" ■