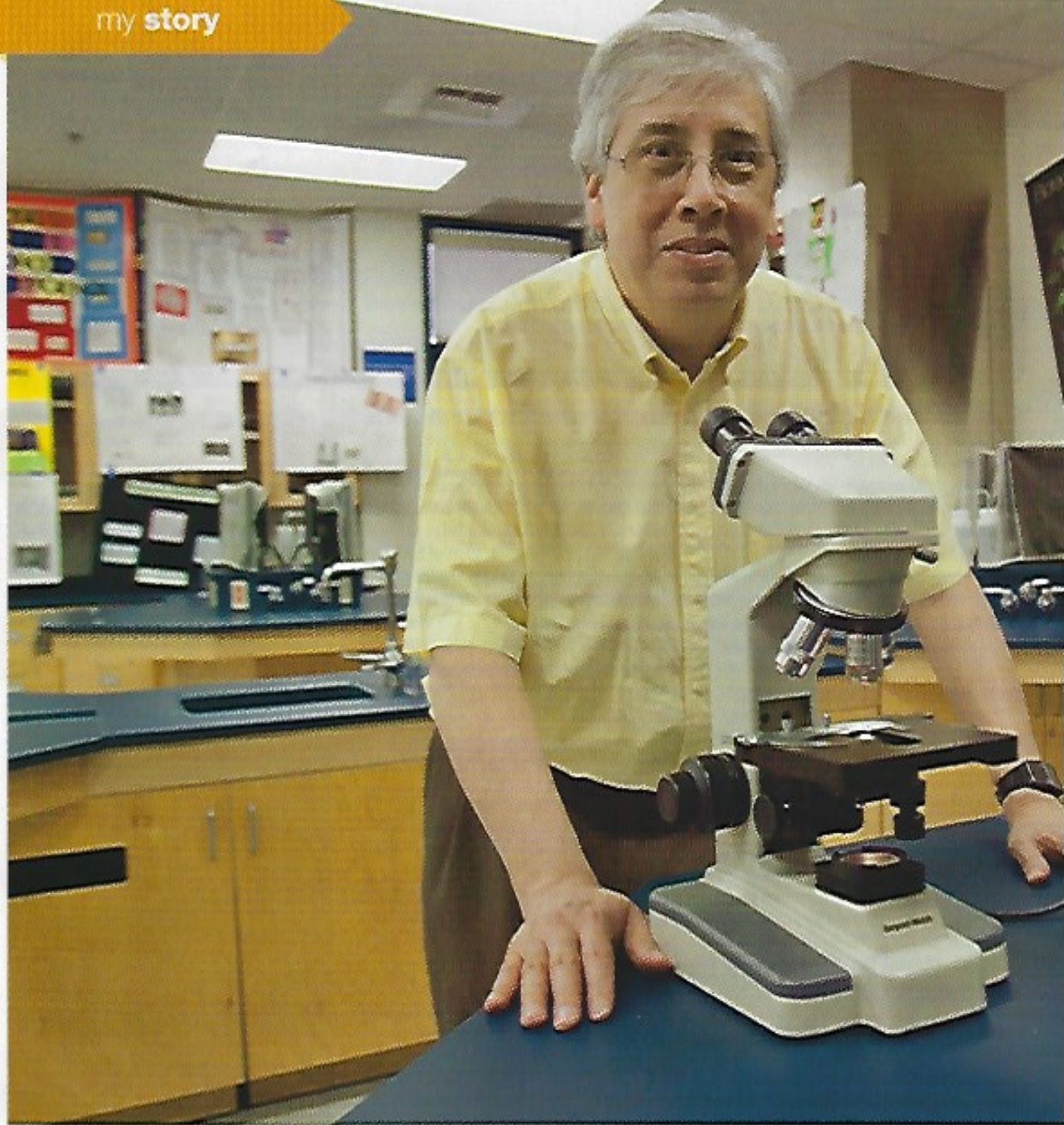


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A pioneer in medical research

Sacramento Catholic schools' alum directs adult stem cell institute dedicated to finding cures for patients

Dr. Alan Moy contends that medical research is too expensive, takes too long, is not transformative enough, and doesn't impact patients by addressing their immediate needs.

That's why after more than 15 years as both a practicing pulmonologist and a University of Iowa medical professor and researcher, the Sacramento native, in 2006, launched the nonprofit John Paul II Medical Research Institute, based in Iowa City, Iowa. The institute works with Catholic hospitals, industry, government and academia in an effort to develop medical research with adult stem cells as a viable substitute for ethically-controversial embryonic stem cells.

Relying on ethics that respect life and a model that is patient-driven, Alan hopes the institute can save lives and shape the future of medicine. "It's more than just doing ethical research. We had to come up with a new paradigm of how to make medical research less expensive and more efficient," he says about the institute's focus on patients. He believes the field of adult stem cell development holds the promise of eliminating the need for embryonic stem cells entirely.

Alan, a 1973 graduate of Holy Spirit School and a 1977 graduate of Christian Brothers High School in Sacramento, has achieved success as a clinician, academician, entrepreneur and scientist.

His upbringing and years of Catholic education gave him the values that guide his work as a physician and researcher. "My parents were very devout Catholics and they influenced me in my faith and moral values," he says. "My father died when I was at Christian Brothers, so my mother, Lloydla, was very influential in imparting Catholic values to her children."

In first grade, Alan wanted to be a priest. In second grade, he dreamed of being a scientist. But, by age 8, he wanted to be a doctor. "I disappointed my first grade teacher by not becoming a priest," he laughs.

His wife, Jeanne, who he met while a medical student at Creighton University in Omaha, Neb., where she was an undergraduate, also has been a great influence on his faith. "Her pro-life views have greatly shaped my practice of medicine and my research," he notes. The Moys have four children, ages 16 to



Dr. Alan Moy visits Christian Brothers High School in Sacramento, where he graduated in 1977.



Dr. Alan Moy on a recent visit to his alma mater.

25, and are members of St. Mary Parish in Iowa City, Iowa.

Alan received a bachelor's degree in biochemistry from UC Davis, where he studied both biology and computer science, and did research one summer for the National Institutes of Health. After graduation, he read the biography of Dr. Tom Dooley, an American who, while serving as a physician in the U.S. Navy and afterwards, became increasingly famous for his humanitarian and political activities in Southeast Asia during the late 1950s.

After reading about Dr. Dooley's life, Alan gave some thought to becoming a missionary doctor. But that changed while he was studying medicine in the early 1980s at Creighton University, when he took a course that sparked his interest and changed his outlook on the ethics of medical research. Taught by School of Medicine Professor Robert Heaney – a recognized expert in osteoporosis – the class focused on the fundamental principles involved in protecting the human rights of research subjects and gave him a solid foundation in the ethics of medical research. That experience had a profound effect on his work in the field of adult stem cell development.

Influenced by Dr. Heaney's commitment to what Alan calls "research that honors the key principles of Catholic moral theology and international law," he has gone on to become a major figure in the national debate on the ethics of using embryonic stem cells as research tools.

With additional training in internal medicine at St. Louis University and subspecialty training in pulmonary medicine at the University of Iowa, Alan for several years was a tenured faculty member at the University of Iowa College of Medicine and College of Engineering, and was funded by the National Institutes of Health in the area of vascular biology and tissue engineering.

He left the University of Iowa in 2005 and founded a regenerative medicine biotechnology company, Cellular Engineering Technologies (CET), and a private practice in pulmonary medicine. Under his direction, CET has developed the world's largest repository of industrial adult stem cells. After founding CET, he became aware of key research areas neglected by both the government and the marketplace, seeing the need for a nonprofit enterprise that could fill these scientific and technological gaps.

That's where the John Paul II Medical Research Institute comes in, as a grassroots effort of Catholic laity and others concerned with the future of ethical biotechnology. "One of our goals is to identify and solve some of the major deficiencies in this country – one of which is to educate people about the ethical issues surrounding embryonic stem

cells," he says.

Another goal of the institute is to treat and cure what he calls "orphan diseases." These are thousands of serious, but rare, ailments that fail to attract research dollars because of the relatively small number of sufferers. Many of these rare diseases may be treatable with existing FDA approved drugs, Alan notes. But drug companies have little commercial incentive to discover these applications, particularly when extensive regulatory burdens are factored into the equation. The institute has created a patient and physician registry on its website for patients suffering from rare diseases to help them find cures.

The institute also is working on providing cancer patients more personalized information, by developing a program where cancer patients can send fresh tumor samples to the institute, where it will isolate cancer stem cells (CSC) and test those cells against a panel of chemotherapeutic agents. CSC are a major reason why cancer relapses, metastasizes and is resistant to chemotherapy and radiation.

It is the institute's hope that such technology will "provide patients more accurate and personalized chemotherapy than the current guessing game that cancer patients are typically subjected to," Alan says. "Patients who are undergoing elective cancer surgery can contact the institute about the possibility of sending a sample of their cancer to us for medical research."

"There are inefficiencies in medical research – it takes too long and costs too much money to develop cures for patients," he contends. "It takes 10 years and \$1 billion to get a drug approved by the Food and Drug Administration. The number of drugs that are being approved by the FDA each year is actually declining."

Alan wants to use disease-specific, non-embryonic stem cell lines to test the effect of existing drugs and therapies on unusual ailments. The method, he says, saves both money and time over research protocols that would involve testing on animals before moving on to human subjects. This approach streamlines the research process, often using patients' own cells to investigate possible cures and treatments.

Both the Knights of Columbus and the Catholic bishops of Iowa are backing the institute's "Collection for Cures," which aims to raise \$10 million for research into rare diseases, regenerative medicine and personalized cancer treatments.

The John Paul II Institute and Cellular Engineering Technologies have partnered to develop a private stem-cell biobank in Coralville, Iowa. Scientists at CET are working to create a bank of more than 5,000 patient and disease-specific stem cell lines and other human cell lines. Pharmaceutical companies purchase those cell lines to test drugs on, while academic and government institutions also buy the cells for research.

These cell lines are derived from adult sources and do not include embryonic stem cells. At CET, scientists extract, purify and grow cells from human blood or tissue. The John Paul II Medical Research Institute recruits patients and doctors in private practice to donate such tissue for research. They have used Mercy Hospital of Iowa City as a source for all the tissue collected.

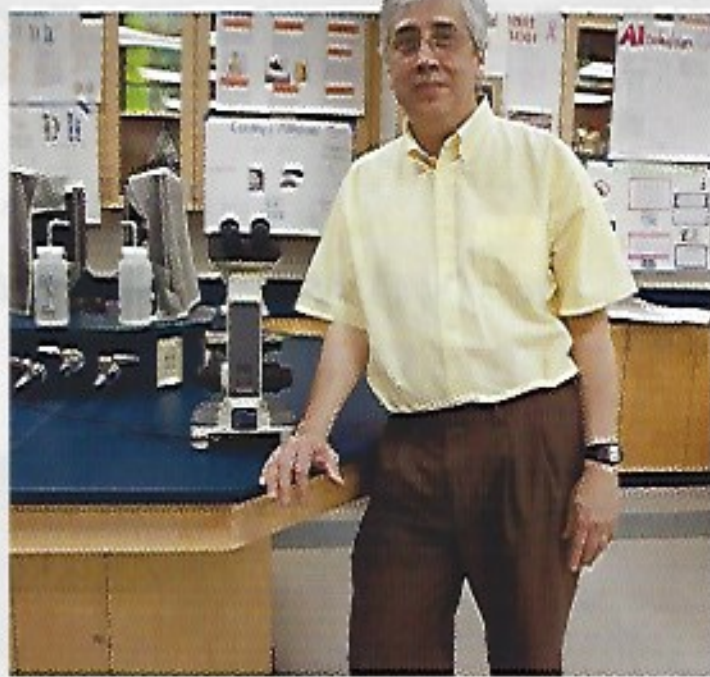
The institute has expanded its operation and is now a federally registered clinical trial center that can work with physicians and patients around the country to collect tissue samples and clinical data from patients with rare diseases and cancer. Alan sees the stem cell biobank as an opportunity to speed up medical research and drug discovery.

Embryonic stem cells, Alan notes, are "pluripotent," meaning they have the potential to differentiate into one of many cell types (nerve, muscle or blood cells). This pluripotency offers new possibilities for replacing diseased tissue or replacing damaged organs. However, embryos used in this line of research are destroyed.

The alternative championed by the John Paul II Institute involves "induced pluripotent stem" (iPS) cells – adult cells that have been genetically reprogrammed to an embryonic stem cell-like state. iPS cells have the advantage, Alan says, of producing pluripotent cells directly from patients without the need for human cloning. In collaboration with other research groups, the institute has developed several different lines of genetically engineered iPS cells from patients with Alzheimer's disease, ALS, Parkinson's disease and muscular dystrophy.

By relying on adult stem cells exclusively, medical researchers can avoid the moral dilemmas associated with embryo-based research, Alan says. In addition, because iPS cells are derived from patients, the cells have an advantage over embryonic stem cells in accelerating drug discovery for diseases.

Although there "is still much hype over the field of embryonic stem cell research," Alan notes that the scientific and medical



Catholic teaching supports ethically-acceptable stem cell research

>> Catholic Church teaching supports ethically responsible stem cell research, while opposing any research that exploits or destroys human embryos.

Because the church opposes deliberately destroying innocent human life at any stage, for research or any other purpose, it opposes embryonic stem cell research as currently conducted. However, when scientists proposed avenues for possibly obtaining embryonic stem cells or their pluripotent equivalent without creating or harming embryos, Catholic leaders were among the first to welcome this idea.

The Catholic Church has long supported research using stem cells from adult tissue and umbilical cord blood, which poses no moral problem. The church supports research and therapies using adult stem cells, which can develop into a variety of specialized cells, alleviating degenerative illnesses by repairing damaged tissues.

communities – along with the research-funding decision-makers at the National Institutes of Health – "are now starting to wake up to the fact that adult stem cell research is not only free of ethical hazards, but also can be much more effective as a tool for finding new disease therapies."

He hopes not only to find new ethical cures and treatments, but also to change the direction of U.S. biotechnology research, by demonstrating the potential that other countries already recognize in adult stem cells. Across the globe, he notes, more than 90 percent of all adult stem cell trials involve adult cells rather than those derived from embryos. But only a quarter of these trials are taking place in the United States.

"We have many challenges ahead, but I believe the medical world and the public will eventually come to embrace the ethical principles we're trying to uphold and that the outcomes of what we do will have broad appeal and application," Alan says. "Human beings – no matter what their stage of development – must have our respect from the moment of conception to natural death."

On the Web:

Learn more about the John Paul II Medical Research Institute at <http://www.jp2mri.org>.