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A woman with blonde hair, wearing a blue suit and a pearl necklace, stands in an office. She is holding two red office chairs, one on each side. The background consists of horizontal blinds. The lighting is dramatic, with strong shadows.

REPRESENTING THE HUMAN RACE...

LORI ANDREWS LAYS DOWN THE LAW ON BIOTECH'S FRONTIER

Photo at right is a mirror image of the photo at left.



BIOTECH'S

CHICAGO ATTORNEY LORI ANDREWS STANDS

Lori Andrews lives in our future. ~ On the frontiers of biotechnology where she has spent her legal career, she serves as both guide and lookout—not just pointing out the territory ahead but also taking us by the arm, looking us square in the eye and asking if we're really sure we want to go there. The terrain she travels is rough, dotted with rocky legal and ethical issues concerning human cloning, embryonic stem-cell research, surrogate

motherhood and the trade in human tissue, issues that, if not already, soon will affect each of us.

"I'm interested in the areas where the law has not caught up with medical technology," says Andrews, a professor

at Chicago-Kent College of Law and director of the Institute for Science, Law and Technology at the Illinois Institute of Technology. "Medicine is always looking forward, while the law always looks back. A lawyer from 200 years ago

transported to a modern courtroom would be right at home, but a doctor from then would be lost in a modern hospital."

That void between the professions is where Andrews operates. The author of several books on the vexing ethical and legal issues raised by biotechnology, she is increasingly in demand as one of the few independent experts on cloning and other far-reaching medical advances. "It's gotten to the point," she says, "where people say, 'If there's no law, call her.'"

One memorable call was from a doc-



BY CHARLES LEROUX

TRAFFIC COP

WHERE SCIENCE AND THE LAW INTERSECT

tor in the midst of surgery to implant an embryo into a woman who would be a surrogate mother. Andrews had the impression that he was scrubbed and gloved, an assistant holding the phone to his ear.

"At the last moment, the doctor had been told that the surrogate was the husband's sister. What he wanted to know was, 'If I do the procedure, is it incest?'"

As often happens in her line of work, there were no legal precedents, so she scanned her computer for case law on incest and saw that the primary con-

cern was with preventing sexual constraint and abuse. "That didn't seem to be the issue here," she says. "I told the doctor that, and he went ahead with the procedure."

THE SUBJECT MATTER of Andrews' career and her ability to pursue it were born simultaneously. She passed the bar exam the very day in 1978 that Louise Brown, the first test-tube baby, was born.

Andrews already had been interested in the issues that the newborn Louise brought to the headlines. As a

psychology major at Yale University, Andrews had written on the psychological aspects of being a hospital patient. Later, she partly financed her Yale Law School education by writing articles on reproductive issues for popular women's magazines.

Aware of his work in related issues, she had sought out Lowell Levin, a professor of public health at the university. He became a mentor. "We had long discussions, we co-authored articles," Levin recalls. "At the time, we were an island in a sea of disinterest." For Andrews, that disinterest became an

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opportunity.

"There wasn't a lot of competition," she says, "in a field where there were huge issues and no ethical direction from the researchers."

Young and petite, Andrews initially had to battle to be taken seriously. "On a lot of panels I'd be the youngest person, half the age of the other panelists and also the only woman," she says. "I was called 'The Teen Lawyer.'"

She recalled that the American Society of Reproductive Medicine was looking for a speaker on a subject she had just written a book about. "They asked me if there was a male lawyer I could recommend. I sent a note with a couple of names and a list of about 30 questions to ask to be sure he was qualified. Someone from the society got back to me and said, 'We'd like you to give the speech, but could you Golda Meir yourself up a little?'" a reference to the authoritative but unglamorous former Israeli prime minister.

Andrews quickly dispelled doubts about her competence. Just two years out of law school, she was invited to Germany to speak at the First World Congress on in-vitro fertilization. Two years later, she was testifying at congressional hearings, advocating that people have a right to create families using the latest reproductive technologies.

Andrews brings a tenacious legal mind to her subject, but she also believes that being a woman and a mother deepens her perspective.

"I think that being a mother makes me ask different questions," she says. "I was at a two-day National Institutes of Health conference in which the question was, 'Should we do gene therapy on a fetus in utero?' There were slides shown of fetuses and slides of fathers holding infants. But there were no slides showing mothers. I asked, 'What about the risks of infection and miscarriage?' Scientists and politicians, most of them being men, forget about the geography of these therapies."

Time after time, she irritates researchers by pointing out that "can" doesn't necessarily mean "should" and that, whenever science intersects human reproduction or human gene mapping or human cloning, there's a person there.

Her style is to layer question upon question: "If this, then what about that, or that or that?"

"She is insightful, penetrating," says professor Levin, now retired. "She's able to cut right through the crap. She's an advocate. Anyone who takes her lightly does so at peril."

Although her base is the not-widely-known Chicago-Kent College of Law, her efforts and reputation are worldwide.

Within a few weeks recently, she met with Microsoft executives in Seattle, then spoke at a seminar on science and art in San Sebastian, Spain. Then it was off to Los Angeles for a party given in her honor by a Hollywood producer ("Hollywood seems to be getting very interested in genetics," she says), then speeches at Cal Tech, the University of North Carolina and Cornell, and a conference in Berlin.

Charles Leroux is a Tribune staff reporter.

"People have rights. They're not widgets. And research isn't, or shouldn't be, a free-for-all."

She has had two books published so far this year, "Body Bazaar" in February and "Future Perfect" in April, with another due soon. Colleagues teasingly call her "The Book of the Month Club."

"There was a short time recently when, for the first time in 20 years, I wasn't up against a book deadline," Andrews says. "I replaced the burned-out bulbs in the house, and then another book contract came along."

Because she often deals with such controversial topics as stem-cell research, Andrews sometimes receives threats and is reluctant to talk much about her personal life, which centers on her son, Christopher, 13.

How does she fit him into such an intense schedule?

"My former husband lives a block and a half from my house," she says. "We have shared custody, and we plan it so he can take over when I have to be gone." She and her ex remain on such good terms that the vacation home he is building will have a room for her.

Sometimes her business trips are occasions for Christopher—also a constant questioner, his mother proudly noted—to further his knowledge and passion for science. "I have no qualms about taking Chris out of school for a day or so if I can give him an educational experience," she says. "He came to Paris when I spoke to the French legislature and to Spain for the science and art conference. He has a picture of himself with the scientist who cloned Dolly the sheep.

"That's a part of my stance on education. Though I was born in the city, I grew up in Downers Grove and went to public elementary and high schools that offered terrific programs for gifted kids. We traveled, we went to the theater, we wrote reports on anything that interested us. I came away with what you might call an alternative approach to authority."

ONE OF ANDREWS' talents is the ability to cut through the most complex, emergent technology with common sense disarmingly delivered. She says her goal as a consultant and expert "is to get in on the design stage of technology rather than just, 'Oops.'" Though she long has sought the grail of a reasoned approach to technologies that seem to emerge daily, much of her time still is spent in the "oops" stage.

She was, for example, able to prevent a slip on the legislative banana peel by pointing out to senators that language in a proposed feder-

al bill seeking to control genetic engineering would outlaw sexual reproduction.

From the calls she gets at her Loop office, she has the sense of a public groping to understand and react to the new technologies.

One such call concerned the legal rights of a severed head. A man had specified in his will that, after death, his head be removed, frozen and later attached to a healthy body. Did the head have any right to the man's estate?

Not as nutty as it sounds, Andrews says, noting that the question raises the issue of whether techniques such as cryonics and cloning might become ways of getting around the never-before-violated rule: "You can't take it with you."

Another call came from a woman who wanted to be implanted with her daughter's fertilized eggs and then give birth to her own grandchild. Yet another caller was investigating the possibility of a sperm bank with deposits exclusively from race-car drivers. "Perhaps they would have a genetic ability to turn left," Andrews muses.

Other calls show that publicity over scientific breakthroughs has given some people an exaggerated idea of how far medical boundaries have been pushed back. Several callers, for example, have claimed regular contact with people who are clones.

"My calls range from absolutely legitimate ethical issues to 'Oh my God, I can't believe anyone is suggesting *that!*'" Andrews says. A temporary secretary once purged half her messages, thinking they were practical jokes.

Even callers with seemingly straightforward questions can raise Andrews' eyebrow. A nervous-sounding administrator at the Centers for Disease Control called to say that, some years earlier, the agency had collected blood samples from 50,000 people, along with X-rays and other medical records. Realizing now that this material is "a treasure trove" for genetic research, the caller said the centers were wondering if, to further investigate those samples, would scientists have to go back to all those people and obtain informed consent? Especially in light of the fact that, he mentioned pointedly, it would cost \$2 million to do so?

"They were really asking if I could come up with a way around going back to get those signatures," Andrews says. "I'm not the moral guardian, but I'm willing to be a naysayer even when there's a lot of money involved. I told them to get the consents. Peo-

ple have rights. They're not widgets. And research isn't, or shouldn't be, a free-for-all."

A WILD WEST atmosphere came to biotechnology research in the 1980s with the passage of federal laws that made the field highly profitable. Before then, any profits from federally funded research belonged to the public, and a researcher who pocketed gains on his or her inquiries faced prosecution.

The Reagan-era legislation turned the old rules upside down. The laws allowed the patenting of federally funded discoveries, gave tax incentives to businesses that invested in academic research, and let federal researchers enter into commercial agreements with companies and add up to \$150,000 in royalties to their taxpayer-supplied salaries. They also allowed scientists to leave academic or government jobs with their discoveries and set up businesses.

Suddenly, as the legislation intended, venture capital began to pour into the nation's research labs, especially those that investigated the life sciences. Though hardly anyone outside the research community noticed, biology had

taken a major turn from "the New England Journal [of Medicine] to The Wall Street Journal," the dean of a major medical school noted.

The commercialization of the human body is, if not in its infancy, perhaps at the toddler stage, with every indication of being a rapid grower. Andrews estimates that hundreds of thousands of patent applications have been filed on human genes, mutations of genes and parts of genes.

"Body Bazaar: The Market for Human Tissue in the Biotechnology Age," which Andrews wrote with Dorothy Nelkin, details the case of Seattle businessman John Moore, a name that might well stand alongside those of Christopher Columbus and others who venture into unknown waters.

Diagnosed with leukemia, Moore consulted Dr. David Golde at UCLA, who recommended surgery to remove his spleen. Moore followed his advice and was cured. The doctor told Moore to return to Los Angeles for follow-up tests that, he said, could not be done in Seattle. Dutifully, Moore returned to California, at his own expense, many times over the next seven years.

Moore eventually learned that the doctor had a motive for the tests beyond monitoring his health. Golde had noticed certain unique viral antibodies in Moore's blood, grew a cell line from the blood and patented it. Ultimately, the Swiss pharmaceutical company Sandoz paid a reported \$15 million for the right to develop the cell line.

In 1988, Moore sued for malpractice and property theft. "My doctors are claiming that my humanity, my genetic essence, is their invention and their property," he told a London newspaper. "They view me as a mine from which to extract biological material. I was harvested."

The California Court of Appeals agreed, but the case was later brought before the state Supreme Court, which, in 1990, ruled that Moore—by then known in the research community as patent No. 4438032—had no property rights to his body or to any profits generated from it.

Andrews' book also describes the commercialization of the techniques of genetic manipulation. W. French Anderson and his colleagues at the National Institutes of Health, the first researchers to attempt gene therapy, got a

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Andrews (center) is working with conservator Nancy Buenger of the Chicago Historical Society on protocols governing DNA testing on such artifacts as the stained cloak worn by Mary Todd Lincoln the night her husband was assassinated. "It would be expensive and it might not tell us anything."



patent on any therapy involving removal, alteration and replacement of a patient's cells.

A Maryland biotech firm, Genetic Therapy Inc., where Anderson headed the advisory board, contracted with the scientists for exclusive rights to the patent. Three months after the patent was issued, GTI, which had been started with just \$2.5 million and had developed no products, was sold to Sandoz for a stunning \$295 million.

"It's like some greedy company came along and patented the alphabet, and then charged each of us every time we spoke or wrote," Andrews says. To her, such profiteering recalls an earlier era. She calls it "the genetic Gold Rush."

The reason the patented products and techniques of biotech research are so profitable is, of course, that health is our most valued commodity. Knowledge of the diseases that long have bedeviled humanity and therapies to fight those diseases are the greatest of treasures.

"As a lawyer," Andrews says, "I'm always dealing with legal cases where things have gone wrong, so I tend to focus on the negative. But I absolutely acknowledge the value of medical research. I just want to be sure the benefits are distributed fairly and there is disclosure of the risks."

One downside of current life-science research is that patents can stifle subsequent research by driving up the cost of genetic test-

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ing and therapy. Scientists may be barred from investigating or using a patented gene or technique without paying licensing fees to the patent holder, and those fees can be exorbitant.

"A genetic test for breast cancer would be about \$50," Andrews says. "Licensing fees make it \$2,500."

AS AN ADVISER to a group of science ministers from 12 of the world's most industrialized nations, Andrews has found that not all countries view biotechnology the way America and its media tend to, with what she called "an aura of the promise of easy solutions and no risks."

"The French wondered how they could get the benefits of technology while still preserving French culture. The Canadians established a list of Canadian values against which to measure technological issues—they wanted to ban commodification, for instance. In the U.S., it was, 'Show me the money!'"

Andrews insists on keeping her feet dry though surrounded by a flood of biotech money. The speeches she gives, the conferences at which she appears, the legal cases she handles all are pro bono. She gets just expenses, occasional public agency grants and her academic salary.

"I've had chances to work for a biotech company or be on the board of a pharmaceutical company and pay off my mortgage [on a Lincoln Park townhouse]," she says, "but I want to be able to give open opinions and not be beholden to anyone."

With potentially huge profits now as much a part of a laboratory setting as Bunsen burners and petri dishes, there are almost no unbiased experts in the biotech field. "The vast majority of biologists sit on the boards of or own biotech companies," she says.

More or less agreeing with her cautious approach to technological breakthroughs are a handful of independent academics, a couple of law professors, an East Coast sociologist, University of Chicago bioethicist Leon Kass and a few others.

On the side of full speed ahead with scientific progress are John Robertson of the University of Texas, who supports the right of an individual to be cloned, and microbiologist Lee Silver at Princeton, who sees a coming era of two distinct, non-interbreeding sorts of people: those who have been genetically enhanced and "normals." After Andrews came out firmly against human cloning, Silver sent her a fax saying: "You used to be so smart."

With so few independent voices in the scientific community, Andrews believes members of the public should be directly involved in decisions about their futures.

"I have trust in the public, since these really aren't technical issues but questions of human values," she says. "The public needs to start to talk about what sort of society they want their children and grandchildren to live in. This generation will set the parameters for the shape of human life for the years to come—if more mechanical forms of reproduction will be hastened or derailed, if we will live among clones, if we'll watch sports played by genetically enhanced athletes."

Often, Andrews finds, the Brave New World already is upon us. She has seen ads in the Princeton University paper seeking egg donors who meet minimum height, athletic ability and SAT requirements. Payments for these eggs can be \$50,000 to \$100,000.

She also cites the case of an Oregon couple who, using the services of a sperm bank, conceived three children born perfectly healthy. The parents later sued the bank, claiming that it should have given them sperm from better-looking donors. The state Supreme Court threw the case out, but on a vote of just 3-2.

"Childbearing is turning into product liability," Andrews observes. "You wonder: If children could be created who were taller, would the NCAA consider that a violation or is it more like private tennis lessons? I know that my own child is wonderful. And the most wonderful things about him are surprises, not things I ever would have thought to program in."

Andrews worries that desires for perceived perfection trivialize the enormous potential of life science.

"Is biology just tinker toys," she wonders aloud, "or does it say something about the nature of man?"

ANDREWS HAS BEEN spending time lately at the Chicago Historical Society following yet another byway of her career. She is working with Nancy Buenger, a conservator there, to create protocols governing how museums, in an age of DNA testing, should handle their collections. At the society, that issue centers on the black velvet cloak Mary Todd Lincoln wore to Ford's Theater the night her husband was assassinated.

"Should the stains on her cloak, which might be blood, undergo DNA testing?" Andrews asks. "It would be expensive and might not tell us anything. The DNA would be 140 years old, and despite 'Jurassic Park,' it might not be usable. You'd need material for comparison. The society has a comb that was supposed to have been Lincoln's that has a lot of wonderful hair gunk on it, mostly dandruff. Can you get DNA from dandruff? Nobody knows."

With the mental agility that has kept her atop

a field that has gone, in 20 years, from deserted and ignored to almost daily front-page news, she leapt from DNA tests of dandruff to the possibility of a future concern for job seekers:

"If you could test the DNA in dandruff, would the technique lead to a time when you go to a job interview and they offer to hang up your coat and then take some dandruff from the collar to test for tendencies to diseases or violence or whatever?"

She describes her thought process as "like writing science fiction. What would it look like if we pursued a certain set of rules? Where is this going? Do we want to go there?"

In more than two decades of questioning the ramifications of new technologies, Andrews has sensed a change in her stance.

"I increasingly feel that a line should be drawn someplace," she says. "We as a society think that each new gadget is something we can't be without—the more information the better. This generation, though, may be the first for which that is not true."

"Where once you'd go to the doctor with symptoms, we're developing what you might call the 'asymptomatic ill,' people who have tested—with tests that may not be all that accurate—as having a tendency for future disease. For these people, there are serious risks of psychological damage and issues of insurability. Such knowledge is toxic knowledge."

ANDREWS RELAXES BY spending time with Christopher, who has introduced her to computer animation and animators, and by reading mysteries. Lately it's been Phillip Kerr's "The Philosophical Investigator," in which the English government screens citizens for a genetic predisposition to violence, and Katherine Neville's "The Eight," the story of a computer expert who is asked to find a chess set with mystic powers. Andrews is writing a mystery novel of her own in which the main character will be a woman gene researcher.

Shortly after her recent Hollywood visit, NBC called expressing interest in creating a dramatic series with the lead character based on Andrews. She has been back to California to meet with writers.

Later this year, her book on genetics-related case law will be published. An earlier book, "Black Power, White Blood: The Life and Times of Johnny Spain," has been optioned for filming by Sony/Columbia.

"The contract was 50 pages of boilerplate," Andrews says, "saying they had the rights to this and that and then, finally, a clause that said there was one right I retain. 'You retain the right to market Lori Andrews dolls,' it said. Maybe I'll be an action figure." □