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Exploring Law and the Biosciences: An Interview with Professor Greely

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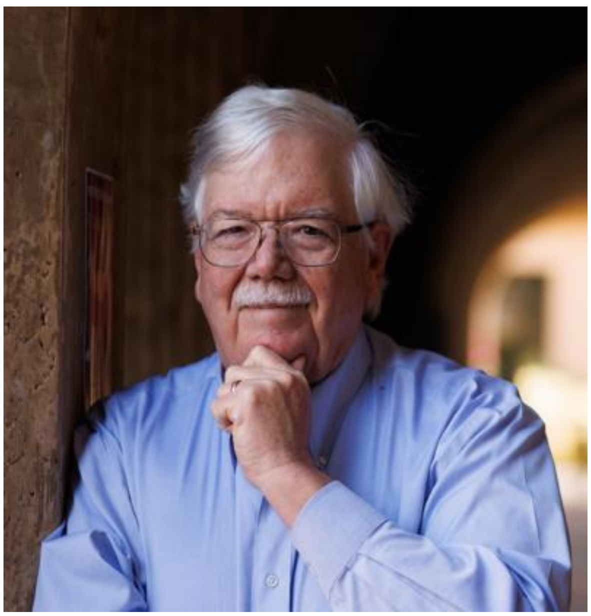

Henry T. (Hank) Greely (BA ’74) specializes in the ethical, legal, and social implications of new biomedical technologies, particularly those related to genetics, assisted reproduction, neuroscience, or stem cell research. He chairs the California Advisory Committee on Human Stem Cell Research and the steering committee of the Stanford University Center for Biomedical Ethics, and directs the Stanford Center for Law and the Biosciences and the Stanford Program in Neuroscience and Society. He serves as a member of the NAS Committee on Science, Technology, and Law; the NIGMS Advisory Council, the Institute of Medicine’s Neuroscience Forum, and the NIH Multi-Center Working Group on the BRAIN Initiative. In 2007 Professor Greely was elected a fellow of the American Association for the Advancement of Science, receiving Stanford University’s Richard W. Lyman Award in 2013, and the Stanford Prize in Population Genetics and Society in 2017. He published The End of Sex and the Future of Human Reproduction in 2016. His next book, CRISPR

People: The Science and Ethics of Editing Humans, was published in February 2021.

Before joining the Stanford Law School faculty in 1985, Greely was a partner at Tuttle & Taylor, served as a staff assistant to the secretary of the U.S. Department of Energy and as special assistant to the general counsel of the U.S. Department of Defense. He served as a law clerk to Justice Potter Stewart of the U.S. Supreme Court and to Judge John Minor Wisdom of the Court of Appeals for the Fifth Circuit.

KP: How did you get involved with the work you do today, and how have your interests evolved and changed throughout your career?

HG: Well, that’s a long story. It all started because my family had several 1920s era copies of Oz books. Most people have heard of The Wizard of Oz, but most people don't know that there were 40 Oz books written by two main authors, and then a couple others near the end. They would come out before Christmas, almost every year between 1903 and sometime in the 40s. And the older editions had prettier illustrations. And, really, I fell in love with the Oz books.

Ultimately, that led me to science fiction, and that led me to science. So, as an undergrad here, when I came in as a freshman, I was not sure what I wanted to be. I was either going to be a Nobel Prize winning scientist, or president, or maybe Chief Justice, but maybe I could do two or three of those all at once, right? The audacity of freshman. But I was genuinely undecided about whether I would end up in science or end up in something that had more of a policy or law orientation. I ended up majoring in political science, though.

By the time I graduated, I was really close to majoring in economics and/or history, as well as political science. I would like to say that I don’t think it’s really true that my path was determined by the second midterm of my third quarter of what was in the fast calculus series… Nobody had calculus in high school in those days, and my native math ability sort of just disappeared unexpectedly on me in that second midterm, but I don't think that really made the difference. But it did hurt my self esteem because I’d always been great at math. To put it simply, integration by trig substitution—bad. But in fact, I think part of my problem was that I liked science, but not any particular science. It’s not like I wanted to be a chemist or a physicist or a cosmologist not particularly interested in biology.

I ended up finishing my undergrad at Stanford, then I went to Yale for law school. My final choice came down to Stanford and Yale Law, those were my two finalists. And I had loved Stanford so much, I figured that if I stayed for another three years, I'd never leave. I thought that I should at least see these other parts of the country that seemed to think they were important. I spent two years, nine months, three weeks, four days, 14 hours, 32 minutes and 47 seconds in New Haven. It was a great education. I'm happy to see it in my rearview mirror.

Then, I worked for a couple of federal judges as a law clerk, one in New Orleans, Judge John Minor Wisdom, one of the great judges of the 20th century, and then Justice Potter Stewart of the Supreme Court. It was a very good job, a lot of work, but also a lot of fun. Then worked in the Carter Administration in both the Department of Defense and Department of Energy. And then on January 20th of 1981, I left that job. I don't normally remember the dates that I left my job, but with the 1981 presidential inauguration, I decided to go and practice law.

While I was at the law firm in LA, one of my fellow associates set me up on a blind date with her sister, who at that point was a resident at LA County Hospital in internal medicine. We hit it off well, and we ended up getting married. She hated my job, and I wasn't all that fond of my job. So, I went on the teaching market and got really lucky to get offered a job at Stanford to teach oil and gas law.

KP: How did you make the shift from teaching Oil & Gas law to focusing on biomedical ethics?

HG: When I accepted the position, I found myself drawn to the science of oil and gas, and I turned it into energy law. This was where interesting things were happening in the 80s. In the meantime, I was married to a doctor, so I started teaching health law, which was a growing interest of mine. I joined the faculty in 1985, teaching oil and gas law, then pivoting to also teach health law in 1986 and 1987. In 1991, I decided that I couldn't keep doing both. At this point, the Human Genome Project was starting up and the planning committee at the medical school wanted me to join them. Since I really liked the committee, I ended up giving a talk at the conference, meeting lots of geneticists. There, somebody asked me to turn my talk into a chapter for a book, which happened.

After this, I found myself pulled into genetics issues on various projects and started writing on that. After the birth of Dolly was announced in 1997 [a lamb cloned from the cells of an adult sheep], I did some work on cloning, which then led me to work on human embryonic stem cell research in 2002. I started working on neuroscience because I thought it was really interesting and important. Along the way, I got involved in research ethics, assisted reproduction, human biological enhancement, de-extinction, and other bright, shiny topics that crossed my eyes. You can learn a lot without taking classes.

KP: What role do you think lawyers play in regulating the biosciences? How is this role important in our larger society?

HG: Well, lawyers play the same role in regulating law in the biosciences as they do in all of our society. We are the grease, we are the lubricant. We're sort of the engineers of social science, and the folks who tried to figure out how to make things work. Now, it's not like figuring out tensile strength of alloys of steel, but it's figuring out how this regulation interacts with that regulation, what the tort implications are, and what the insurance questions might be. People think that most of what lawyers do is fight in court, but litigators are actually a minority among lawyers. Most lawyers are involved in making deals and making things happen. Biosciences is already a huge industrial sector if you think about pharma and biotech. You're talking about probably half a trillion dollars in the U.S. For that much money, there's a lot of law and there's a lot of lawyers. The need for lawyers, I think, is only going to expand.

KP: What do you find most exciting about your intersectional work with science, ethics, and the law?

HG: Everything. It's so much fun to learn new things. The great secret to being a teacher is to realize that what it really means is you get to be a student for the rest of your life, except there's no required classes. You can study anything you want. It's fun thinking about scientific experiments, and how things fit together.

Most of our scholarship in most fields involves, to go back to an earlier life of mine, drilling oil wells straight down. A scientist can have a very important and rewarding career spending their entire career studying one receptor molecule on the exterior membrane of one cell type and species, learning everything there is possible to learn about that. You got all these people drilling these deep wells, but there's a lot of knowledge from connecting the wells or the lands between the wells. This intersection is important, leads to unexpected conclusions, and it's fun. Stanford is one of the best places to do it. Cutting across these borders is something Stanford has been doing for a long time.

KP: A significant portion of your research has focused on CRISPR, and you've even published a book about the topic. How has gene editing changed the global conversation about public policy and healthcare?

HG: It hasn't changed as much as it should, or it will. But it has made the reality of DNA editing, genome editing, and nucleic acid editing much more possible. With CRISPR, you can now take a human cell line and knock any one of those chains out of it and see what happens, or knock three of them out and see what happens, or put different versions in. Not with humans, but with rats and mice, you can actually have living creatures and see if they're changed. CRISPR is an enormously powerful research tool, but it's also a potentially enormously powerful medical tool.

What bothers me is that some people relate CRISPR with science fiction. Although I love science fiction, I love it as fiction. Drama is almost always involved in a science fiction context. Most of life, as I've observed it over 70 years, is actually just about muddling through. We don't come up with perfect solutions, but we don't end up with perfect disasters either. Most of the time, every once in a while, a disaster gets through, like what Putin is doing to Ukraine. But most of the time, it doesn't. Most of the time we muddle through. Fiction is useful for freeing up your imagination, and seeing where things may go, but don't take the plotlines very seriously.

KP: Why is it important to think about the ethics behind new biomedical technologies? Are there particular facets of the biosciences that have more ethical issues at play?

HG: So, first, I use ethics as kind of a shorthand. In the genetics area and more generally in the biosciences area, we tend to say we use this acronym ELSI, referring to ethical, legal and social implications. Every once in a while, I suggest, and some others have suggested, ELSPI: ethical, legal, social, and political/policy implications. In general, I don't think of myself as a bioethicist. I think of myself as a law professor who works on the ethical, legal, social and policy implications of the biosciences: some of which are ethics, some which aren't. Why do we have to worry about ethics thought that broadly? Well, we have to try to figure out ways that both the research and its products will be used in ways that tend to maximize the benefits and minimize the harms.

The two most important ethical issues in almost all research are safety and efficacy. For example, we now have some gene therapies approved by the FDA. They cost $2 million a pop. How are we going to get those to the public? Will someone who needs it have to pay a whole $2 million? Ultimately, different people do ethics and bioethics in different ways. Mine is undoubtedly heavily influenced both by my own personality and background, but also by my legal training and the fact that I've been teaching law for 38 years. I think the important part is to try to figure out what needs to be done in order to make research work well and not poorly.

KP: When it comes to addressing ethical issues in science, how do you navigate the conclusions you come to, especially since ethical questions are not often black-and-white?

HG: They're rarely black and white. But that's easy for lawyers. Most of what we do in the first year of law school is try to convince students that everything's complicated. The right answer to every legal question should begin with "it depends." Sometimes in my legal work, I just lay out the facts and say, "Hey, it's not for me to decide. Here are the issues. You make the choice." I believe that people should know the issues and make their own choices, both about what they think is ethical & proper for themselves or their loved ones and for what they think their society should say. Sometimes, I do have recommendations because I think the issues are fairly clear.

For example, I just published a piece on embryo research saying that I think we should move the so-called 14-day rule, which allows research on human embryos until the 14th day of development, to about 28 to 35 days in the four-to-five week range. But, for instance, if you believe that embryos are living people and deserve the right to life, you shouldn't agree with my recommendation. That's okay. Different people start from different starting points and I don't believe that there is a clearly right ethical answer to almost any question. I believe that almost any ethical question will end up with a complicated answer.

KP: What importance does historical context play when exploring current trends in new scientific findings and development?

HG: As we get older, in many ways, we don't think as well as we did, at least we think we don't think as well as we used to, but we console ourselves with the thought that we are wise. And I think a lot of experience is that most things turn out not to be as exciting as they initially look. I think historical context is really helpful in making you more conscious of how often things don't work out the way they're expected to. Often, that's kind of reassuring. Sometimes, it's not. For example, if somebody wants to bring some sort of new predator into the Sierra forest that will eat bark beetles that are killing trees. That sounds like a good idea, unless you know about mongooses being brought into Hawaii to eat rats and cane toads being brought into Australia to kill something. It doesn't work out well. I think historical context provides you with a set of past examples of how complicated things could be.

KP: How do you think public policy and politics influence how people view scientific advancement?

HG: Enormously, a little bit, and not at all. Depends. Take quantum computing for instance, there's a lot of hype or a lot of interest in quantum computing. I don't have a clue whether it'll ever mean anything. There are a few people paying attention to it, but it's not a public discussion. It's not a policy issue. Legislatures aren't passing laws about it. Now, the Webb Space Telescope. Well, that's a little bit different because they have just announced they think they found a galaxy that formed 300 million years after the Big Bang. Well, that gets people excited and interested in the Big Bang and its theological, religious, and other implications. Anything about human prehistory gets people really excited. Anything about human brains gets people really excited. Climate science, 40 years ago, nobody cared, except for maybe the oil companies who worked in coal companies who wanted to keep it as quiet as possible. Climate science now, everything's controversial, so I think there are at least three dimensions in the answer to your question

One is: how powerful is science or technology? The second is: how immediately relevant does it seem to be. The third is: how does it tie into or affect things people deeply care about? And so, if you look at something like COVID, which is pretty immediately relevant and pretty powerful. All this has been heavily influenced by politics from the moment the pandemic started.

KP: How do you feel about the current state of the biosciences field and what are you looking forward to in the future?

HG: So, I think right now, we know, basically, infinitely more than we did 30 years ago. Much of which has just allowed us to be confused at newer and deeper levels. I think 30 years from now, they will look back and say to those people in 2022 that they thought they knew something, but they knew nothing. In the future, many of their advances will have led them to be confused at deeper and deeper levels. I think bioscience right now is an enormously exciting place of accelerating information, and has been frankly for the last 60 years at least. Some of this is because of activity in other areas that bioscience as we know it now wouldn't exist without. Take advances in computer technology, for example. I think, at least for the foreseeable future, which could always go wrong, we could have World War III tomorrow…

But assuming civilization survives, I think for certainly for the rest of my life and probably for the rest of your life, bioscience is going to continue on an accelerating path to tell us more and more about biology. Give us more and more power to do real bioengineering to make things from the ground up. When we talk about biosciences, we're talking about us and that adds an extra layer of interest in the complexity of it all.