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Beat COVID-19? Cure cancer? Isaacson's bestseller delves into gene editing, the breakthrough that could do both

by **Emily Liner**
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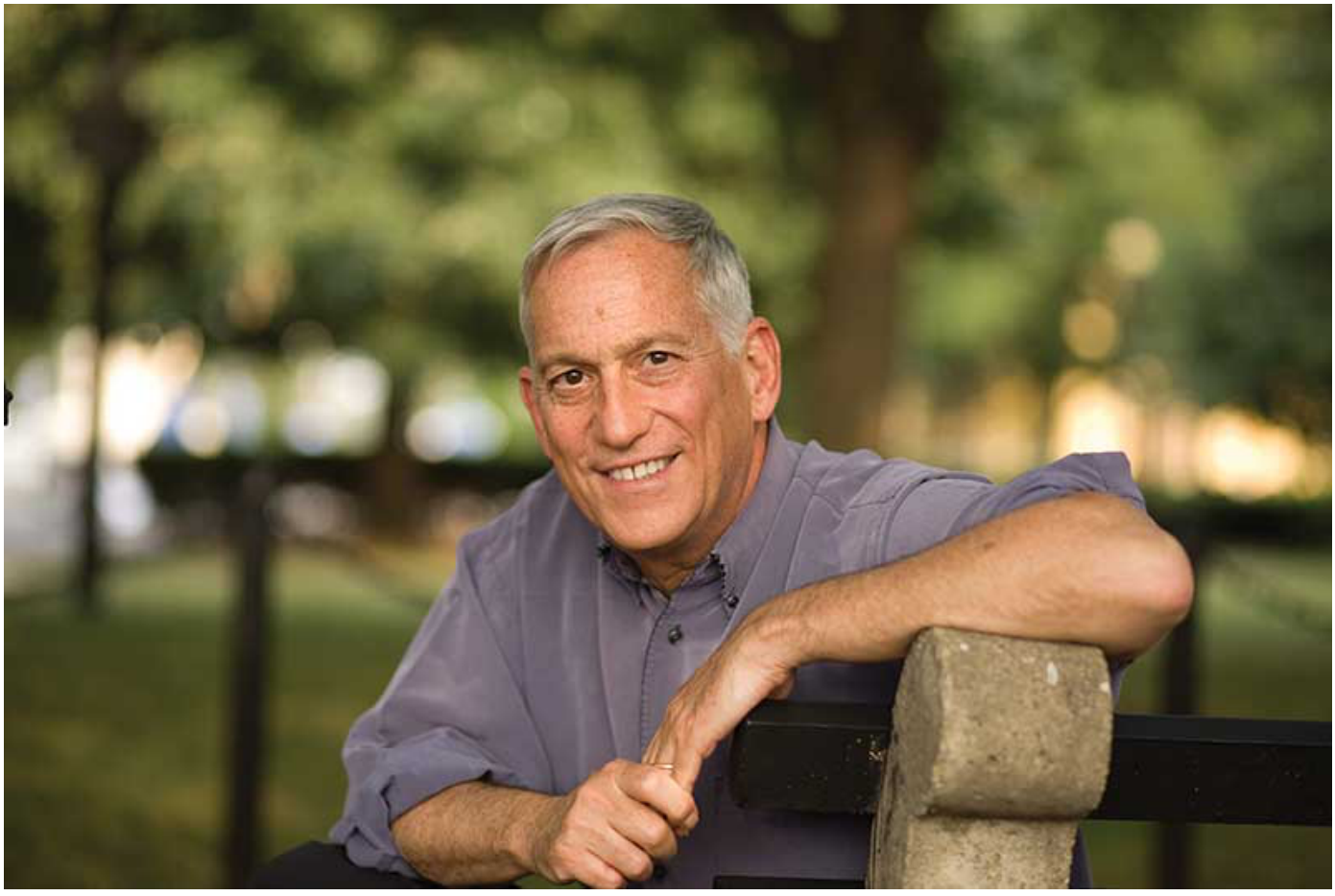

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Walter Isaacson is the king of the blockbuster biography. The former CNN and TIME executive has written the definitive histories of iconoclasts like Leonardo da Vinci, Albert Einstein, Benjamin Franklin, and Steve Jobs.

Isaacson was slated to headline the **Mississippi Book Festival** to discuss his latest nonfiction bestseller *The Code Breaker: Jennifer Doudna, Gene Editing, and the Future of the Human Race*. Though the annual event was cancelled for the second year in a row due to the COVID-19 pandemic, plans are underway to present author talks later this year.

Isaacson's book spotlights Jennifer Doudna for her role leading the development of gene editing, which he describes as not just the biggest revolution of our lifetimes, but perhaps in the history of humankind.

Doudna won the 2020 Nobel Prize for Chemistry alongside Emmanuelle Charpentier, making them the first two women to jointly earn a science Nobel. While *The Code Breaker* acknowledges numerous researchers who have pushed forward gene editing, Isaacson said that Doudna "did the most to figure out the moral implications."

"When I met her, she was such an exciting and dynamic figure I decided she'd be a great subject, but more importantly a great role model for people who want to appreciate this new age we are entering," Isaacson told Mississippi Today in an interview.

What Isaacson admires so much about Doudna is her lifelong pursuit of curiosity, starting with her youthful observations of nature growing up in Hawaii.

"That's the trait that all of my subjects from Leonardo da Vinci to Benjamin Franklin to Jennifer Doudna have, and it's wonderful because it's a trait that all of us can nurture in ourselves," Isaacson said. "Sometimes you pursue curiosity for its own sake—not because you need to know why the sky is blue or why the water swirls the way it does, but simply because you're curious. And then that curiosity turns out to be useful."

Useful is an understatement when it comes to gene editing. Doudna and Charpentier earned their Nobel for identifying how it works in bacteria. They realized that a special combination

of RNA can cut and paste genetic code in certain areas of DNA nicknamed CRISPR, an acronym for clustered regularly interspaced short palindromic repeat.

The game changer is that this can also edit human DNA. Gene editing could soon prove to cure cancer and genetic disorders that cut lives short.

Scientific advancements in RNA technology have already contributed to the innovative development of coronavirus vaccines. In previous generations of vaccines for diseases like chicken pox and polio, recipients are given the actual virus in a killed or weakened form.

The coronavirus vaccines available now are different. Instead of the virus itself, they deliver a segment of genetic code called messenger RNA (mRNA). This code activates the body to create a lookalike to a piece of the virus. This helps the immune system recognize and destroy it later, after the mRNA in the vaccine itself decomposes naturally.

Additionally, CRISPR technology is being adapted for coronavirus testing and treatment. Home testing kits including freeze-dried CRISPR are on the horizon.

What CRISPR also makes possible — in stark contrast to vaccines — is the ability to make edits in human embryos that last across generations. Editing the "germline" allows an individual's children to inherit the edited genes.

Scientists around the world are approaching germline gene editing as delicately as if it were radioactive. It strikes at the heart of what it means to be human, provoking an avalanche of ethical questions. One of the biggest concerns is whether gene editing could snowball into a new form of cosmetic surgery, selectively engineering traits deemed desirable for a costly price.

"Now that we have this tool, who gets to use it, who gets to decide, and when do we use it?" Isaacson said. "I think that one of the important issues we'll face with gene editing is how to make it fair, to make sure that rich people can't simply buy better genes and design their children and make them taller or have better memory."

Coincidentally, meaningful precedents emerged here in Mississippi. The first ever heart and lung transplants were conducted at the University of Mississippi Medical Center by Dr. James D. Hardy in the early 1960s. At the time, transplant surgeons like Hardy were accused of

playing God. The viability of organ transplantation ultimately led to its widespread practice under strongly enforced medical guidelines.

Fast forward to today, and Mississippi again plays a leading role in the advancement of medicine. Victoria Gray of Forest was the first volunteer for CRISPR-based gene therapy to treat her sickle cell disease, which has appeared successful thus far.

“Victoria Gray is one of the pioneers of this age of genetic medicine,” Isaacson said. “She was brave in order to be the test pilot for editing the genes of her blood cells so that she no longer has sickle cell. And this has shown the world that this tool can be very useful, instead of just some Frankenstein that we’ve created.”

Isaacson believes that Mississippians will continue to contribute to this new frontier of science.

“Mississippi is a place of great diversity. That was true of Florence in the 1400s, and it was true of Philadelphia in the 1700s,” Isaacson said. “That’s usually the mark of places that are cradles of creativity.”

As for Isaacson, his next big profile is already on deck. According to recent reports, he’ll be tackling a well-known and controversial tech entrepreneur: Tesla founder Elon Musk.

*Emily Liner is the owner of **Friendly City Books**, an independent bookstore and press in Columbus, Miss.*
