ANGUS MEANS BUSINESS
NATIONAL CONVENTION & TRADE SHOW

Genomics: Consider the Big Picture

DNA sequencing offers key to breakthroughs in food production and treatment of disease, but with opportunity come ethical and legal considerations.

*Story & photo by **Troy Smith,** field editor*

It is in humanity's hands to wield genomics as a tool for the betterment of mankind … or not. That's the opinion of Richard Resnick, CEO of Genome Quest, a provider of computer software used in genomic research. In a keynote address delivered during the Angus Means Business National Convention & Trade Show in Overland Park, Kan., Resnick urged both advocates and skeptics to take a "big picture" view of genomic reality.

Calling upon his experience, which includes work on the Human Genome Project, Resnick offered a primer on the fundamentals of DNA and genome sequencing and cited numerous applications of the technology in human medical diagnostics, as well as in crop and livestock production. Clearly a proponent of GMO (genetically modified organism) food, he also warned that genomics applications hold potential for unintended consequences and purposeful misuse.

Sharing breakthroughs in human medicine, Resnick cited the case of twins originally misdiagnosed with cerebral palsy. However, sequencing of their genomes eventually revealed the twins shared a gene mutation associated with a lack of serotonin. Treated with serotonin, they gained near-normal function. Resnick said genomics also led to the discovery of mutations associated with cystic fibrosis and successful treatment with medication.

"Cancer also is a disease of the genome, and we are absolutely on a path to treatment by finding mutations responsible and prescribing drugs to target specific kinds of cancer," added Resnick. "Genomics can help us all live longer, much longer, but there is the question of whether the Earth will be able to feed us in the future."

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Resnick noted that 80% of the corn grown in the United States is genetically modified "Bt" corn, which is resistant to a specific insect that causes dramatic yield loss. "Roundup-ready" soybeans were developed through genomics to resist the weed herbicide glyphosate. Research is currently under way to identify genes associated with various aspects of livestock health and performance. Resnick said these and other agricultural applications of genomics hold much promise for enhancing food production for humans.

However, Resnick said the technology must be used wisely. Potential consequences must be considered, including limitation of genetic diversity, negative effects of pesticide use and broader ecological impacts. Resnick said there are ethical and moral concerns, too, particularly with certain human-related applications.

"It's likely that we'll find ways to edit the genome to prevent baldness, but if we found ways to improve a human's IQ, to give them perfect pitch, to make them faster and stronger, could there be a problem with that?" asked Resnick. "In China, research is under way to edit genomes of human embryos. Is there a problem with that?"

Resnick noted that the U.S. Constitution's 4th Amendment does not prohibit the surreptitious collection of DNA samples — for example, taking the sample from a coffee cup from which a person has taken a drink, but without that person's knowledge. Imagine if someone secured the DNA of a high-positioned U.S. political figure and developed a virus that targeted his genome specifically. Reportedly, added Resnick, a former U.S. secretary of state ordered the surreptitious collection of DNA from certain foreign leaders. Is there anything wrong with that?

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Editor's Note: *Troy Smith is a field editor and cattleman from Sargent, Neb. This article is part of the online coverage of the Angus Means Business National Convention & Trade Show provided by Angus Media. Visit the convention Newsroom available at* http://angusjournal.com/NCnTS/2015/index.html *to access additional summaries, PowerPoint presentations and the audio of the sessions.*

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