

Genetic tools move from lab to your pocket

BY PETER GREDIG

Understanding and mapping the genetic code of living organisms has become a cornerstone of human health care and modern medicine. It's also the future of plant and animal food production.

We've come a long way in a relatively short period of time. When the human genome was first mapped successfully in 2003, it had taken a legion of scientists 13 years and an estimated US\$3 billion. Today, a handheld device is able to do the job in a few hours for less than \$1,000. And you don't need a PhD to use it.

What are the implications of these quantum leaps in genomic sequencing and DNA identification?

From a human health perspective, easy, fast and inexpensive DNA testing could speed the diagnosis and treatment of disease. Analyzing the DNA of mutated cancer cells from a biopsy would identify the specific profile of the disease and the best, least invasive treatment. Being able to check the genetic makeup of a bacterial infection would let your doctor know if it was a strain resistant to certain antibiotics.

All this may soon be done right in the doctor's office with a device not much larger than a smart phone. As we learn more about what genes are involved with different ailments, the potential to treat, cure or prevent health issues grows.

Similar uses will provide huge benefits for agriculture. Growers and agronomists will be able to test weeds to identify the species

and determine whether it has developed herbicide resistance so appropriate weed control strategies can be employed with confidence. Fruit and vegetable growers will differentiate between nearly identical pests like aphids and select the appropriate control methods.

The benefits for livestock producers will mirror those available to humans. Disease identification, down to the specific strain of the disease, will improve the ability to treat outbreaks and avoid development of resistance.

The food sector will immediately identify food fraud, particularly for fish that is purported to be a high value species but is actually something less desirable.

A business called TRU-ID arose from the University of Guelph's efforts to build a database of species gene sequences. Called Barcode of Life Database (BOLD), it covers thousands of species. The TRU-ID handheld hardware allow users to positively identify any species in the BOLD database.

Jamieson Natural Sources, a Canadian company that sells vitamins and herbal food supplements, recently partnered with TRU-ID to confirm the authenticity of the active ingredients in their products.

It's only a matter of time before these types of devices will be in the toolbox for agronomists, veterinarians and producers. ■

