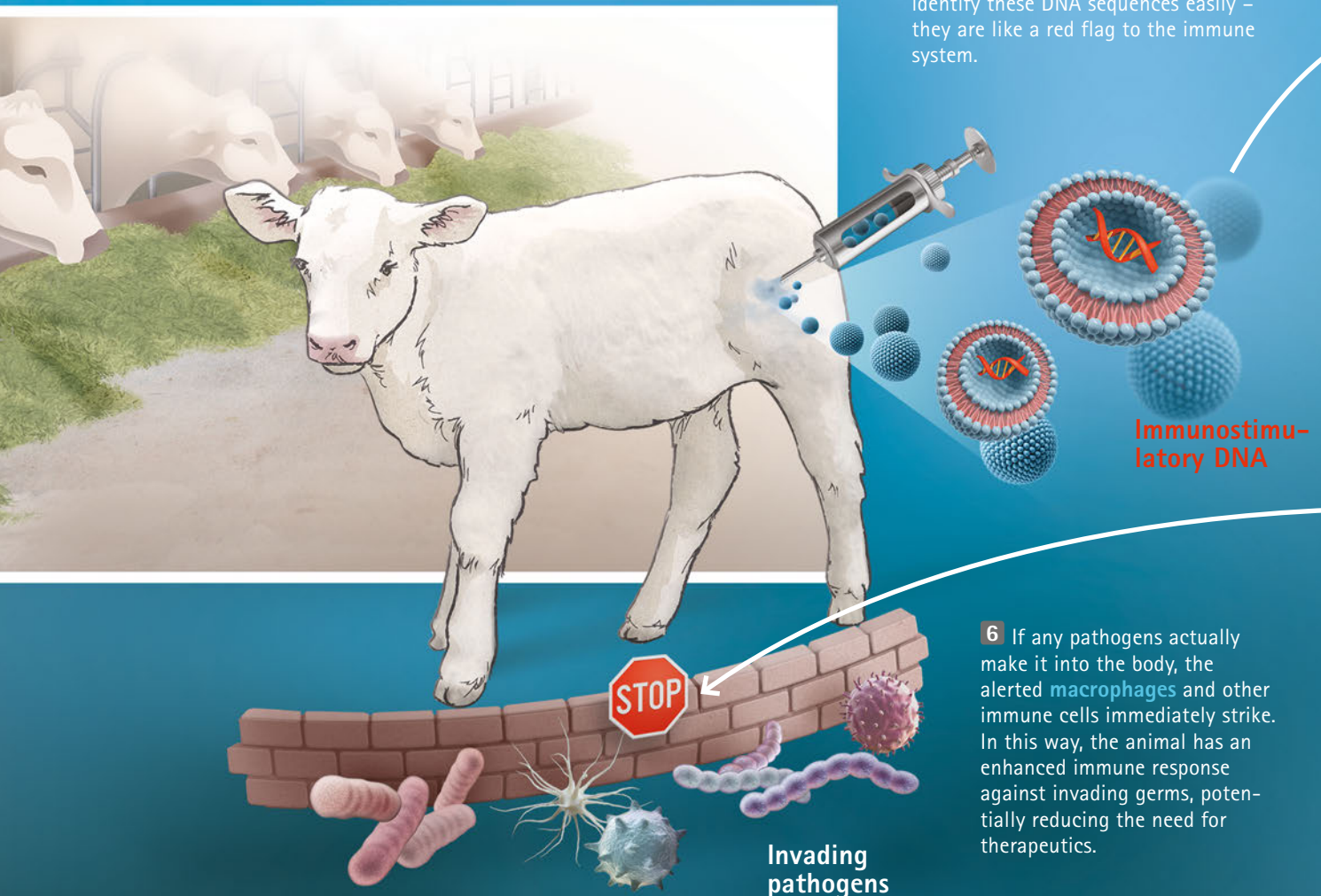


Enhancing immunity

Complex infectious diseases remain a key challenge in animal husbandry despite the availability of effective veterinary medicines. Vaccines and antibiotics are commonly used, but they are only effective against specific pathogens. Stimulation of the innate immune system has been shown to provide a rapid, potent and broad protective response to infectious agents. Scientists at Bayer are exploring the potential of immunostimulants to help veterinarians and producers around the world better mitigate infectious diseases in livestock. Daniel Keil, Director of Clinical Development at Bayer HealthCare Animal Health North America, has worked together with a multi-disciplinary team of Bayer scientists to develop Immunostimulatory DNA for veterinary use. This product is based on technology developed by Juvaris BioTherapeutics and is patent protected. The Animal Health applications are being exclusively developed by Bayer Animal Health and are the subject of Bayer patent applications.

1 The immunostimulant is injected into the muscle tissue of beef cattle. It contains special Immunostimulatory DNA encased in a protective membrane (liposome).

2 The active constituent of the immunostimulant is **Immunostimulatory DNA** (mixture of CpG and non-CpG immunostimulatory motifs). Its structure is typical for the genetic material of pathogenic bacteria and viruses. The animal's immune system can therefore identify these DNA sequences easily – they are like a red flag to the immune system.



6 If any pathogens actually make it into the body, the alerted **macrophages** and other immune cells immediately strike. In this way, the animal has an enhanced immune response against invading germs, potentially reducing the need for therapeutics.

“Reduce the infection pressure”

research spoke with Dr. Artur Summerfield, professor of Veterinary Immunology at the University of Bern, about opportunities for immunostimulation in veterinary medicine.



What's the significance of this advancement in Immunostimulatory DNA?

Immunostimulatory DNA enhances the immune system's ability to react to microbial infection by putting the immune system into an alarm status. This can be beneficial for animals as it can potentially protect them at times when they are exposed to multiple pathogens or other stressors. Animals with stronger immune defenses are likely to withstand infections better, which could reduce antimicrobial use, lessen animal suffering and minimize economic impact.

How can immunostimulants benefit animal husbandry?

Vaccines, antimicrobial therapies and good animal husbandry practices will always be important. Immunostimulants will complement these approaches, offering veterinarians and producers an innovative non-antibiotic option that can help enhance animals' natural defenses and reduce the infection pressure. This would benefit animals as well as consumers.

