New antibodies may help treat “shipping fever” in cattle

What is this research about?
Bovine respiratory disease complex (BRDC) is a potentially fatal disease in cattle that results from having multiple bacterial and viral infections at the same time. “Shipping fever”, as BRDC is known to most cattle producers, gets its nickname from the fact that cattle are most vulnerable during the stressful and crowded situations that are created when they are being transported. Bovine herpesvirus type 1 (BoHV-1) is one of the viruses that may contribute to shipping fever, and is also responsible for infections of the respiratory and reproductive systems of cattle. Shipping fever alone costs the U.S. cattle industry up to $3 billion dollars a year. Since the existing vaccines against BoHV-1 do not provide full protection, giving cattle antibodies against the virus are likely to be helpful. Antibodies are small proteins made by the cells of the immune system, which help the body to recognize a virus or virus-infected cell and attack the virus.

Keywords:
Cattle, bovines, herpes virus, antibody, vaccine, shipping fever, bovine respiratory disease complex (BRDC)

What did the researchers do?
The researchers took the genetic material from a cell that was producing BoHV-1 antibodies, and made small changes to the specific gene for the antibody. After making many copies of this new gene, an electric current was used to introduce these copies into new cells. For this second step, the single-celled organism called Pichia pastoris was used. Next, the antibodies that were produced by the P. pastoris cells were isolated. To determine how well these antibodies could attack BoHV-1 viruses, the researchers then added the antibody to infected cells to assess their attacking ability.

What you need to know:
Some antibodies against bovine herpesvirus type-1 have the ability to join together into groups of two or more, which were found to be much more effective at recognizing and attacking virus-infected cells than single antibodies were. These new antibodies may help treat bovine respiratory disease complex and “shipping fever” in cattle.
What did the researchers find?
The antibodies isolated from the *P. pastoris* cells were not all identical, due to changes that occurred after the antibodies were created. Some antibodies had parts cleaved (cut off), some had small sugar molecules added, and some naturally joined together into groups of two or more antibodies. These groups of antibodies, called multimers, were effective at recognizing and attacking BoHV-1 viruses in the living cells. In fact, they were twice as effective as single antibodies (monomers). The variation in attached sugar molecules, however, did not seem to impact the effectiveness of an antibody.

How can you use this research?
**Veterinary scientists** can use these effective antibodies against bovine herpesvirus type 1, along with more cost-effective ways to control and eradicate BoHV-1 infection.

**Cattle producers** can use this research to identify new and potentially more effective ways to treat and control BoHV-1 infections and "shipping fever".

Article citation: