

1 **Title:** An Investigation of the Novel use of Bacteriophages to Diagnose and Treat Johne's
2 Disease in Cattle

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11 **Abstract:**

12 Johne's disease is a scourge to dairy farmers all over the world. It is an infectious disease that
13 causes chronic inflammation and lesions along the inside of the small intestine of, primarily,
14 ruminant animals (i.e., cattle and sheep). It is an incurable disease and urgently requires new and
15 radical intervention strategies. Apart from careful on-site farm management practices, little can
16 be offered to farmers to reduce the risk of infection, and nothing short of livestock culling is
17 effective once an animal becomes infected. Currently, there are no vaccines licensed in Ireland or
18 antibiotic treatment strategies available for Johne's disease. This study is currently investigating
19 the feasibility of introducing bacteriophage therapy as a means of controlling Johne's disease by
20 targeting the drug-resistant pathogen responsible, *Mycobacterium avium* subspecies
21 *paratuberculosis*. Bacteriophage therapy is the practice of using bacteriophages, genetically
22 diverse viruses that specifically infect and destroy bacteria hosts, to treat bacteria-based
23 infections as an alternative to antibiotic-based treatment methods. Preliminary research has
24 indicated that two individually tested environmental samples presented bacteriophage activity
25 when used on host bacteria *Mycobacterium smegmatis*. Future research will include the
26 investigation, isolation, and propagation of the potential bacteriophages from these two
27 individual samples and their potential application as anti-mycobacterial agents on more virulent
28 mycobacteria pathogens, such as *Mycobacterium avium* subspecies *paratuberculosis*.

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