

Late last year, two veterinary practices – Synergy and Bishopton – founded the Cattle Lameness Academy in a quest to bridge the gap between research and foot services on the ground. Ann Hardy reports from the academy's inaugural seminar.

# Vaccine under way for digital dermatitis

**T**he prospect of a vaccine for the prevention of bovine digital dermatitis

(BDD) is moving rapidly closer, and UK research is leading the way. A vaccine would represent a significant step forward in the control of digital dermatitis, and could have implications for other lesions in cattle as broad ranging as pressure sores and ischaemic teat necrosis.

Details of the latest developments were described by Stuart Carter, professor of Infection Biology at the University of Liverpool's Institute of Infection and Global Health, when he addressed vets, farmers and foot trimming professionals at the Lameness Academy seminar in Somerset.

He explained how techniques developed at the Institute had enabled 120 isolates of treponeme bacteria – the primary cause of BDD – to be purified, identified and grown, compared with just 22 identified throughout the rest of the world.



Vaccine for prevention of digital dermatitis is going under trial.

This gave the university a clear lead in the development of a vaccine which, he said, was on the verge of being tested through a pilot scheme.

## Important

Explaining why a vaccine could be so important, he said: "There are no effective treatments for BDD at the moment. There are some which make it go away but it will come back."

This problem stemmed from the fact BDD was primarily caused by treponemes, which could penetrate the skin and initiate a lesion and which were followed by secondary

infections which inflamed the local area.

"Most antibiotics only work on the secondary infection, so the disease occurs again and again," he said. "And penicillin and macrolides are the most effective against treponemes, but they are not readily usable in milking cows."

Footbaths were also said to be increasingly limited as modern antibiotics such as cephalosporins were not permitted for foot-bathing, while other chemicals such as formalin and copper sulphate were 'slowly being banned across Europe' due to their potential environmental threats.

These developments, together with an apparent 'recent increase in the range of tissues affected' and widespread pressure to reduce antibiotic use, has added urgency to the requirement for a vaccine, which Prof Carter said was being developed using genome sequencing and the latest 'reverse vaccinology' technology.

## Tests

Tests at the university had revealed treponemes were present in all the lesions studied, including those associated with the non-healing forms of white line disease, sole ulcers and toe necrosis.

However, isolation of these bacteria in pressure sores, hock lesions and – within the past few months – in lesions associated with ischaemic teat necrosis was said to represent a new era in the disease.

"These organisms make the lesions very difficult to treat," said Prof Carter. "So, although digital dermatitis is the primary target for the vaccine, we are confident it will make a contribution to

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treating severe, non-healing forms of white line disease, sole ulcer, toe necrosis and other treponeme-associated lesions.”

However, although vaccination was expected to represent a breakthrough in BDD prevention, Prof Carter said high levels of biosecurity were essential.

This has been highlighted by recent findings revealing that foot-trimming tools may carry infection and could be spreading treponemes to other farms and animals.

“Foot trimming profes-

sionals have responded very positively,” said Prof Carter. “Some have even chosen to leave their trimming equipment on farms, which is a good development.”

### **Efficacy**

The next step, he said, was vets and foot trimmers trying different antiseptics to clean their equipment, and plans were being developed to send swabs to the university where each chemical’s efficacy would be tested.

“I have had hundreds of emails from them since the



findings on ischaemic teat necrosis were published just before Christmas, and they’ve come up with positive ideas as a profession and are driving this forward.”

With an estimated annual cost of BDD to UK dairying

“Foot trimming professionals have responded very positively  
**Stuart Carter**

of £26 million, and treponemes now present in every dairying nation worldwide and transmitting across many species, the development of a vaccine could be well worth the effort, he said.