

Technology offer

A biological to treat pyoderma

Background

Staphylococcus pseudintermedius (SP) is an opportunistic pathogen in dogs and a major cause of topical canine infections in the ear canal (otitis externa) and skin (pyoderma).

Incidence rates are very high in veterinary dermatology with more than 90% of canine pyoderma cases caused by this pathogen. Skin infections are treated with either oral and/or topical antibiotics during 4-6 weeks.

Since the underlying problem frequently persists, a continued antibiotic treatment facilitates these staphylococci to become methicillin-resistant *S. pseudintermedius* (MRSP). MRSP increasingly affects dogs and is recognized as an urgent problem by the European Medicine Agency being present in most of these pyoderma infections. This limits the therapeutic possibilities for veterinarians, but importantly, also puts public health at risk, as MRSP can spread zoonotically to pet owners.

MRSP functions as a reservoir of resistance genes, which can spread to human pathogens. The gradual adaptation of MRSP from dogs to humans is currently closely monitored.

Other staphylococcal species cause skin infections in animals, including *S. schleiferi* in dogs, *S. felis* and *S. epidermidis* in cats and (methicillin-resistant) *S. aureus* (MRSA) in horses.

Target market

The market of antimicrobials for veterinary dermatologic diseases is estimated at \$1.2 billion and is expected to grow with a compound annual growth rate (CAGR) of 7.7% by 2026. Factors that define this rapid market growth are: (1) the growing population of companion animals, (2) increased focus on improving animal health and (3) a growing prevalence of animal diseases.

The pharmaceutical segment of dogs within the companion animal health market is predominant over that of cats, horses and even of all other companion animals taken together. Likewise, the pharmaceutical segment of dogs within the animal health market is expected to grow with a CAGR of 8.2%.

In a One-Health context, certain antibiotics are increasingly restricted and banned for use in veterinary medicine. Specifically for the treatment of canine pyoderma, a diversity of topical/oral antibiotics is sold from which only cefalexin and penicillin G are allowed without restriction. All other antibiotics can only be used after mandatory identification of *S. pseudintermedius* as causative agent.

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World-leading healthcare authorities (e.g. WHO, CDC, ECDC) launch urgent calls for the development of new antibiotics with a clear emphasis on classes of antibiotics with a novel mode-of-action (MOA). Indeed, the traditional approach based on mining of natural small molecule antibiotics and chemical modifications thereof is largely exhausted. Novel MOA are needed to expand the current limited armory and our biological clearly responds to this need.

Technology

We engineered a novel and performant biological for the treatment of canine pyoderma caused by MRSP.

The biological is an engineered protein with antimicrobial properties.

The biological

- has been validated *in vitro* against a panel of clinical strains from canine pyoderma and otitis externa patients.
- has a good safety profile (no cytotoxicity) for application on canine skin
- rapidly kills MRSP after topical application
- can cure pyoderma after some few days of topical treatment
- enables the natural microbiome of the skin to restore

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Proof of concept

Two dogs with chronic recurrent pyoderma caused by a multidrug-resistant MRSP were used to assess the safety and efficacy of our biological in an *in vivo* proof-of-concept (POC) study.

The biological was applied as a hydrogel during several days. One hour after every application, a dedicated area was swabbed for the follow-up of the remaining number of SP bacteria (colony-forming units; CFU).

For both patients, a significant improvement of the clinical appearance of the lesions was seen in the first 4 days with a corresponding decrease in CFU. Over the course of the treatment, an increased diversity of bacteria could be retrieved from the swabs implying the return of a balanced skin microbiome.

At the end of the therapy, no adverse reactions could be identified, and all lesions had disappeared (see pictures below). After follow-up consultations, no new lesions have appeared in either of both patients.

In summary, this POC in a naturally occurring disease model shows the potential of our biological for the topical treatment of canine pyoderma.

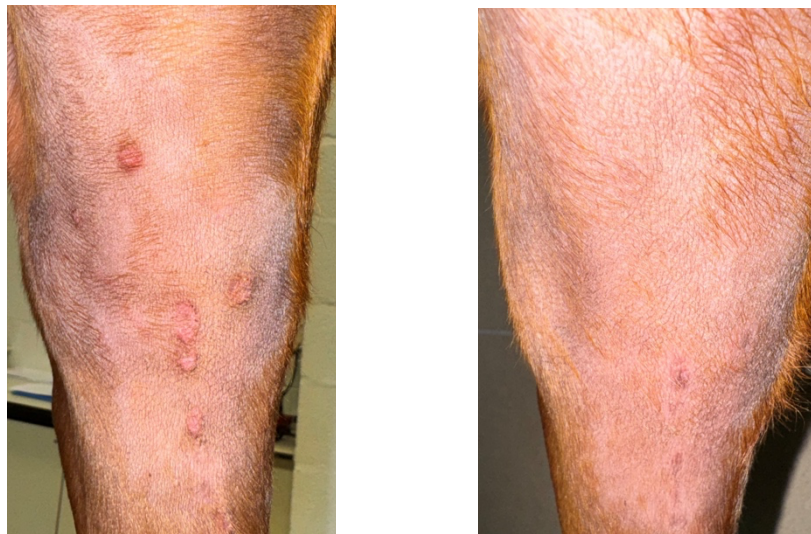


Figure 1: Case of MDR MRSP on a dog with pyoderma: leg before and after treatment with our biological

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IP-position

Patent application

Partnering

We are reaching out to partners who are interested in development and marketing of our novel biological.

We can offer expertise and facilities for production of the biological, *in vitro* and clinical (in patients) *in vivo* evaluation.

Contact

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