With Nekro Veyxym®, Veyx-Pharma has succeeded, in the field of veterinary medicine, to launch a market ready enzyme suspension that can be applied parenterally. Approval of Nekro Veyxym® has been obtained for application in cattle, calves, pigs, piglets, sheep and goats. The special formulation of this preparation facilitates intramuscular application of the proteolytic enzymes chymotrypsin, trypsin and papain in combination without causing injection site swelling.

Nekro Veyxym® meets the basic requirements for good efficacy combined with the absence of any residue accumulation and any environmental contamination. A withdrawal period for food producing animals is therefore unnecessary.

Treatment with proteolytic enzymes is now a recognized form of therapy in both human and veterinary medicine. One of the main reasons for the increasing acceptance of enzyme therapy is the explanation of the mode of action of the therapeutic proteases used. Above all over the past decade, the immunological and microbiological research in both human and veterinary medicine has made a significant contribution towards providing this explanation.

The biological effects of proteolytic enzymes

The specific action of proteolytic enzymes (e.g. chymotrypsin, trypsin and papain) exerts an influence on the immune defence system after these substances bind to α_2-macroglobulin. The enzymatic effect inhibits mechanisms of adhesion (microphages, macrophages) to endothelial cells and fibroblasts. Their action also regulates receptors on immune defence system cells, i.e. excessive immune reactions are inhibited.

Systemic application of combinations of enzymes that show synergetic effects (e.g. a combination of chymotrypsin, trypsin and papain) can dissolve thrombi, fibrin agglomerations and necrotic tissue, reduce blood serum viscosity and intensify the phagocytotic activity of macrophages. This results in improved microcirculation at the inflamed site and to restoration of homeostasis. The enzymatic breakdown of these products improve the prospects for healing, especially in view of the fact that inflammation products and tissue detritus consisting of or containing protein provide a good nutrient substrate for bacterial proliferation and that such products tend to inhibit the effects of antibacterial chemotherapeutics due to their protein content and abnormal pH. Proteolytic enzymes thus support therapy with antibiotics or sulphonamides and improve healing rates with these treatments. The presence of endogenic anti-proteases in healthy tissue ensures that viable tissue will not be damaged by the enzymes during this "cleanup operation". Extensive in vitro testing at the Institute for Bacteriology and Mycology of the Faculty of Veterinary Medicine at the University of Leipzig confirms that the proteolytic enzymes trypsin, chymotrypsin and papain changes the surface structures of microorganisms (e.g. fibronectin binding protein, IgG-Fc receptors, protein A, clumping factor, hydrophobia), with the result that the microorganisms are no longer capable of attaching themselves to the host cells. The pathological properties (virulence) of the germs are thus reduced.

The proteolytic enzymes also inhibit growth of pathogenic organisms and delay proliferation rates in various microorganisms (see Fig. 1). In Streptococci, they shorten the chain (see Figs. 2 a, b) and disturb the formation of both blastospores and chlamydospores in some species of Candida.

The biological activity of the toxins and enzymes produced by Streptococci and Staphylococci is inhibited or reduced by the proteolytic enzymes.

Proteolytic enzymes also improve the efficacy of antibacterial chemotherapeutics by reducing the minimum susceptibility concentration of antibiotics for some pathogens through 2 or more dilution steps (determined in dilution series testing).

In the smooth musculature, chymotrypsin stimulates contractility. In hollow organs, for example the uterus, this could result in better voiding of pathological contents.

Nekro Veyxym®

Suspension for injection with proteolytic enzymes

- Immunostimulation
- Fibrinolysis
- Breakdown of inflammatory products and necroses
- Growth inhibition of pathogenic organism
- Support of antibiosis
- Tumour growth inhibition
- No withdrawal period

Proteolytic enzymes promote the disintegration of tissue that is proliferating uncontrollably. They break down the fibrin mantle of cancer cells and thus help prevent formation of metastases. Immune complexes that contribute to the metastatic process and are pathologically significant are also disintegrated.

Marketing authorisation holder
Veyx-Pharma GmbH
Soehreweg 6
D-34639 Schwarzenborn, Germany

Statement of the active substances and other ingredients
1 ml contains:
Active substances:
1,200 FIP-U chymotrypsin
120 FIP-U trypsin
15 FIP-U papain

Pharmaceutical form and content
Oily suspension for injection
Bottle with 50 ml and 100 ml

Indications
Cattle, calves, pigs, piglets, sheep and goats:
As a supplementary treatment in cases of bacterial infections involving pronounced accumulation of exudate, e.g. infections of the lungs, udder and navel, arthritis, puerperal diseases, phlegmons, panaritia as well as in actinomycoses, papillomatoses and malignant tumours (both preoperative and postoperative).

Contraindications
None.

Adverse reactions
Application of preparations containing enzymes sometimes results in more or less pronounced swelling (particularly following injections and application in the udder). This effect is harmless and can be characterized as a strong tissue reaction to the substance; it will disappear without complications.

Target species
Cattle, calves, pigs, sheep, goats

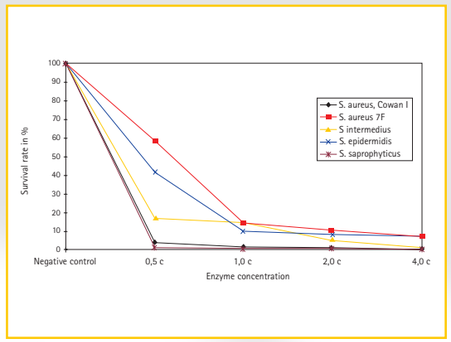

Fig. 1:
Survival rate of Staphylococci following 2 hours of treatment with a mixture of trypsin, chymotrypsin and papain compared to an untreated culture (negative control = 100%) (KRÜGER et al. 1999)

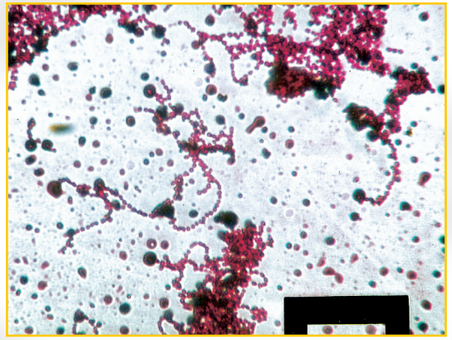

Fig. 2a:
Streptococcal chain length of Sc. dysgalactiae (negative control)

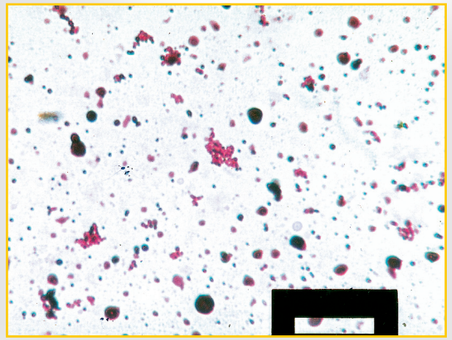

Fig. 2b:
Streptococcal chain length of Sc. dysgalactiae following 2 hours of treatment with a mixture of trypsin, chymotrypsin and papain

Dosage for each species, routes and method of administration
0.4 ml per 10 kg body weight.
Apply at several sites depending on size.

For intramuscular application.

One to three times at 24-hour intervals; in cases of actinomycosis and papillomatosis: 3 times at intervals of 8 to 10 days.

Withdrawal period
Cattle, calves, pigs, piglets, sheep and goats:
Edible tissue: 0 days

Cattle, sheep and goats:
Milk: 0 days

Special storage precautions
Do not store above 25 °C and protect from light. Shake before use.
Do not use after the expiry date which is stated on the label and the outer carton.
Keep out of the reach and sight of children.

Available on prescription only

Special precautions for the disposal of unused product or waste materials, if any:
Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal product should be disposed of in accordance with local requirements.

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