

# **Inflammation-induced pain in cattle: why and how we should alleviate it?**

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Inflammation is elicited during commonly occurring diseases in cattle such as enteritis, mastitis, and claw disease, and is also caused by husbandry procedures including dehorning and castration. Inflammation causes swelling, redness, heat, reduced function (e.g. stiffness) and pain. Pain arising from inflamed or injured tissues may arise spontaneously in the absence of an external trigger. Also, responses to noxious stimuli may be enhanced (hyperalgesia) or normally innocuous stimuli may produce pain (allodynia), so that even everyday procedures such as walking or being milked may cause the animal discomfort. For ethical reasons and to reduce pain-inflicted production losses, farmers and veterinarians should work together to minimize pain and suffering in cattle. This is also important for the public, as health and well-being of dairy and beef cattle continue to be scrutinized by consumer groups.

Both the peripheral and the central nervous systems are involved in recognition of pain, and in these systems a variety of receptors play a role in nociception. The most effective way of modulating pain is thus to use so-called multimodal therapy, where drugs with effects on different parts of the nerve system and on different receptors are combined. Thereby, maximal effect is obtained while side-effects of the applied drugs are kept to a minimum. Reduction of inflammatory pain relies on treatment of the inciting cause and on use of analgesics. To be most effective, pain medication should be initiated as soon as possible in the course of disease, because chronic pain may have a blunted or unpredictable response to analgesics. Where possible, a preemptive analgesic strategy should be adapted, where analgesics are provided before the inflammation-inducing stimulus, e.g. dehorning.

A number of drugs and techniques for providing analgesia in cattle are available and will be detailed in the lecture.