

Ivermectin resistance in *Haemonchus contortus*

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ABSTRACT

Ivermectin is an antiparasitic drug often used to treat internal and external parasites. *Haemonchus contortus*, commonly known as barber worm. It is a parasitic nematode that poses a serious threat to livestock, particularly in agriculture. Over the years, anthelmintics such as ivermectin have been widely used to control and treat these parasitic infections. However, the emergence of resistance to ivermectin in *Haemonchus contortus* has increased concerns in the scientific community. The article also describes the possible mechanism and consequences of ivermectin resistance

Introduction:

Ivermectin is a semisynthetic antiparasitic derived from avermectin, which is a class of highly active broad-spectrum antiparasitic drugs isolated from the fermentation products of *Streptomyces avermitilis*. It can be used orally, topically, and parenterally (1).

Ivermectin and its Mechanism of Action:

Ivermectin belongs to the macrocyclic lactone class of anthelmintics. Its mode of action which involves binding glutamate-activated chloride channels in the nervous system of parasites, causing an influx of chloride ions and subsequent paralysis of the nematode. This paralysis causes the worm to be ejected from the host animal's gastrointestinal tract and ultimately the nematode dies (2).

Resistance mechanism:

The extensive use of ivermectin in livestock has placed selective pressure on *Haemonchus contortus* populations, leading to the development of resistance. This resistance can be recognised to numerous aspects, including genetic mutations and over expression of drug-detoxifying enzymes within the parasite. Genetic mutations at the target site of ivermectin, such as B. glutamate-gated chloride channels, may affect the efficiency of the drug. Moreover, the upregulation of P- glycoproteins, which are efflux transporters responsible for pumping xenobiotics, including anthelmintics, from nematode cells, contributes to reduced drug concentrations in the worm (3).

Impact on Livestock Management:

The emergence of ivermectin resistance in *Haemonchus contortus* has meaningful suggestions for animal husbandry. Infestations that were once efficiently controlled by anthelmintics may now fade away, resulting in reduced production, low expansion rates, and increased death of affected animals (4).

Integrated Parasite Management:

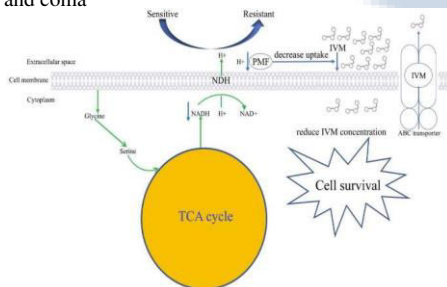
To overcome the challenge of resistance, a holistic approach to pest control is essential. Integrated pest management (IPM) is a pattern of tactics such as precise pointed therapy, rotational grazing, and the use of other anthelmintics with different courses of act (5).

Conclusion:

The resistance of *Haemonchus contortus* to ivermectin features the lively environment of parasite control in livestock. To refer this trial, a full and balanced methodology is vital to make sure animal welfare and the long-term efficiency of anthelmintics in agriculture. Without a proper analysis of the disease, we should not use Ivermectin. In case of overdose, the medicine should not be controlled. An overdose can cause heart problems, lung problems, and coma

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Picture 1: Mechanism of resistance