Reducing the future threat from (liver) fluke: realistic prospect or quixotic fantasy?

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The liver fluke remains an economically significant parasite of livestock and is emerging as an important zoonotic infection of humans. The incidence of the disease has increased in the last few years, as a possible consequence of changes to the World’s climate. Future predictions suggest that this trend is likely to continue. Allied to the changing pattern of disease, reports of resistance to triclabendazole have appeared in the literature, although they do not all represent genuine cases of resistance. Nevertheless, any reports of resistance are a concern, because triclabendazole is the only drug that has high activity against the migratory and damaging juvenile stages of infection. How to deal with the twin problems (of increasing incidence and drug resistance) is the overall theme of this session on “Trematodes: Fasciola hepatica epidemiology and control” and of this talk to introduce the session.

Greater knowledge of fluke epidemiology and population genetics will highlight those regions where surveillance is most required and indicate how quickly resistant populations of fluke may arise. Models of disease risk are becoming increasingly sophisticated and precise, with more refined data analysis programmes and Geographic Information Systems (GIS) data. Recent improvements have been made in our understanding of the action of triclabendazole and the ways in which flukes have become resistant to it. While microtubules are the most likely target for drug action, tubulin mutations do not seem to be involved in the resistance mechanism. Rather, upregulation of drug uptake and metabolism processes appear to be more important and the data relating to them will be discussed. The information may help in the design of new treatment strategies or pinpoint potential molecular markers for monitoring fluke populations. Moreover, various “-omics” technologies are beginning to make an impact on the identification of novel targets for drugs and vaccines and they will become increasingly important in these areas. One aspect of disease management that remains inadequate, however, concerns the diagnosis of resistance. This has led to erroneous reports of resistance, which is hampering effective control of fasciolosis, as farmers may (be tempted to) switch to less effective drugs. A number of diagnostic tests are under development and progress with them will be reviewed. Finally, some recommendations with regard to strategic dosing programmes will be made.