Resistance to several classes of antihelmintics is not associated in parasitic nematodes: why should it be?

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However, there is widespread emergence of anthelmintic resistance to almost all groups of anthelmintics available. There have been reports from various parts of the world about resistant strains emergence especially in Haemonchus contortus a highly pathogenic nematode. Benzimidazole is among prominent anthelmintic group against which resistance is emerging very fast. The mechanism of benzimidazole resistance appears to be most common in many species ranging from fungi to nematodes and involve alteration in gene encoding β tubulin isotype1. Present study was carried out to find out the variation existing in β tubulin gene isotype 1 which is directly involved with drug binding capacity involving microtubules polymerization. Adult nematode H. contortus were subjected to DNA extraction, amplification and sequencing. Out of 50 individuals analyzed 37 showed benzimidazole susceptible gene while 13 were resistant indicating single nucleotide mutation at amino acid 200 TTC/TAC. In addition 12 organisms showed several regions of consistent difference indicating single nucleotide polymorphism (SNPs) at various positions in coding region. This was first study carried out in area to find the trends about emergence of resistance.

RESISTANCE TO SEVERAL CLASSES OF ANTIHELMINTICS IS NOT ASSOCIATED IN PARASITIC NEMATODES: WHY SHOULD IT BE?

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Each of the three commercially available anthelmintic classes target different mechanisms in the nematode. Thus, resistance to one drug would not be expected to influence resistance to another. However, synergy between drugs has been recorded in experimental and field studies. The hypersensitivity of resistant Caenorhabditis nematodes to different drug classes is indicative of an association of resistances to anthelmintics. The efficacy of a benzimidazole and of levamisole used against human hookworm infections was largely enhanced when both drugs were combined, providing additional support to sustain the hypothesis of synergy between drugs. One may also suspect that farming practises which favours resistance to one drug may also influence the build up of resistance to another. Specifically, frequent treatments with the same anthelmintic, their use in the absence of worms in refugia, and absence of quarantine add a high probability of introducing resistance. There is a real need to establish the independence or synergy to anthelmintics in field conditions. This study tested the hypothesis that resistance against each of the three main anthelmintics (benzimidazoles, levamisole and avermectins) were independent of each other. Data was analysed from 16 published surveys of sheep, goat or cattle gastrointestinal infections regrouping data from more than 1000 farms. An anthelmintic resistance status was assumed when the faecal egg reduction test was below 90%. The predicted calculations were as follows: based on independence of probabilities for single resistance: the calculated associated resistances between Bz (Benzimidazoles) and Lev (Levamisole) resistance was equal to the frequency of Bz resistance in farms multiplied by the frequency of Lev resistance in farms. For example, in one survey these resistances were 56% and 53% respectively, thus making an associated resistance of 30% (56/100 x 53/100 = 30/100). This was comparable to the actual observed value of 35%. These calculations were based on the theorem of composed probabilities: i.e., event A is independent of event B if the probability of A is independent of B; in that case the probability of A and B is the result of the multiplication of the probabilities of A and of B. The differences between the expected and observed frequencies were statistically evaluated; they never were significant for all set of data. The relationship between observed and calculated associations of anthelmintic resistances was high and demonstrates that anthelmintic resistances in the field are indeed independent of each other. This means that combination of drugs could be sustainable in field conditions, when resistance status is not exactly known.
XIth European Multicolloquium Of Parasitology

Cluj-Napoca – Romania
July 25th-29th, 2012

PROGRAM
&
ABSTRACT BOOK

IMPORTANT NOTICE
The abstracts included in this book are the proceedings of the “XIth European Multicolloquium of Parasitology”, as provided by the authors.
Dear Colleagues,

Welcome to Cluj-Napoca, Romania! Please find enclosed the program and the abstracts of communications to be presented to the XIth European Multicolloquium of Parasitology (EMOP XI, Cluj-Napoca, Romania, July 25th-29th, 2012).

The organizers of the 11th "European Multicolloquium of Parasitology" in Cluj-Napoca, Romania, aim at including it into the coordinates of the European traditionalism, already adopted at the previous multicolloquia in other European centers.

In the contemporary world, dominated by significant changes in all aspects of life - social, economic, scientific, and technical etc., from the smallest living organisms to mammals and humans, the scientific research in the medical field and in the field of biology has turned towards new main directions. In the universe of living organisms, parasites must be tackled and studied from evolutionary, co-evolutionary, and joint perspectives.

The re-defined medical research, based on interdisciplinary arguments shall ensure: a) a deepening of the investigations in the fields of molecular and parasite-ultrastructure biology, further directed towards those of ecology and eco-parasitology; b) a reassessment of the conflict between the host and the parasitic species, in which each partner is under possible changes; c) the monitoring of the diseases caused in the host (both in humans and animals) by parasitic species, with modified, and often insufficient, protective capacities.

For a correct diagnosis of parasitic diseases it is necessary for the trans-disciplinary scientific research to upgrade the diagnostic methods, supported by observations from nanology, immunology, genetics, eco-parasitology and cryoparasitology. The modern transportation means favor the displacement of both parasites and their biological vectors, expanding their developmental areas and introducing parasitic diseases to naïve regions of Earth. As a consequence, the epidemiological parameters of parasitoses in humans and animals are continuously changing, further complicating the diagnosis.

The problems encountered in prophylaxis and therapy impose the disclosure of new molecules, representing an alternative to classical treatments by use of natural, organic products, such as those used in plant based phyto-therapy. These types of compounds lack side effects and withdrawal periods for food products of animal origin (meat, milk, eggs etc.).

A relatively novel, but very important branch of parasitological research deals with development of antigen isolation techniques. In this branch, the improvement of isolation methods to obtain highly immunogenic antigens suitable for vaccine development has to be a priority, especially when it comes to aggressive, zoonotic parasites.

Similarly, investigations should be carried on, to clarify the therapeutic potential of parasitic products in human medicine, such as in cancer therapy, as well as the potential beneficial role of antagonistic parasitic relationships, i.e. hyper parasitism.

The organization of high level scientific events, in which relevant scientific and academic international partners take part, at regular intervals, as well as the support of joint publications (editing, co-editing proceedings volumes and books) and joint editing of internationally ranked journals and periodicals, may lead to the international spreading and acknowledgement of Parasitology.

We would like to wish you a fruitful congress.

Santiago Mas-Coma
(Chairman of European Federation of Parasitologists)
Monica Junie
(Vice-president of National Organising Committee)
Vasile Cozma
(Chairman of National Organising Committee)