

## Book Review

*Toxocara: The Enigmatic Parasite* (ed. Holland, C. V. and Smith, H. V.), pp. 320. CABI Publishing UK. ISBN 1 84593 026 6. £75.00; US\$ 140.00.  
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This is an excellent book by all the criteria that I employ. The editors have done a really splendid job in assembling the various contributory chapters that cover a wide range of topics relating to this parasite. There is a unified approach, so often lacking in multi-author edited books, and the excitement of all of the contributors, and their deep fascination with this particular parasite, is evident in almost every page. The term 'enigmatic' that appears in the title, reappears many times throughout the text, not only in the editors' own introduction but also in the individual contributions. And it is a well-deserved term because this parasite is certainly a wizard of sorts. In fact, just recently on a field trip to Poland, I witnessed 10 pups being treated with anthelmintic and then proceeding to expel worms over the following week. To my amazement, the expelled burden eventually filled a large jam jar. It was an impressive sight and emphasized to me again that this worm really does know how to jump from host to host. Its transplacental route of transmission, and its potential to lie dormant for years in the tissues of the bitch, have to rank as some of the most amazing survival strategies of any helminth. It is these, of course, that explain why almost every pup throughout the world already carries the worms at birth. The efficiency of transmission has fascinated parasitologists for decades, but it is only now that we are building a convincing picture of the molecular basis of some of the mechanisms employed by *Toxocara* for survival, including its amazing escape from the effector arm of the immune system.

The book is divided into 4 sections, each of which is further subdivided. Section 1 is entitled 'Biology of *Toxocara*', section 2 'Clinical aspects and public health', section 3 '*Toxocara* in the veterinary context' and finally the 'Economic impact of the disease'.

The first section, of which the first component is molecular biology, has 3 contributions, each fascinating in their own respect. Chapter 1 (Maizels *et al.*) is an excellent review of the molecular biology of the parasite and how the advances in our understanding of the molecular structure of the worm, especially its excretory antigens, is helping to piece together the parasite's immune evasive strategies (these include antigen shedding, but also competition with host lectins and thereby confusing the innate recognition system). Then in Chapter 2 Gasser *et al.* review the

range of molecular techniques that can be used to differentiate between species and to assess genetic variation within species. In particular, they draw attention to the limitations of morphological criteria and show how morphologically identical species have been shown to represent distinct species by expert use of these methods. Chapter 3 (Kennedy; 'The larval surface') considers the surface of larvae, and compares it with that of *Ascaris*. It includes the results of some unpublished experiments and provides thought provoking discussion about the structure of the cuticle in relation to the survival needs of *Toxocara*. Clearly the parasite is extremely adaptable, being capable of surviving in a range of hosts as a larva, and its capacity to exploit paratenic hosts is impressive.

In the next section (*Toxocara* as a model system) Pinelli *et al.* (Chapter 4: '*Toxocara* and asthma'), review the evidence for associations between infection and asthma, and provides support from murine models that infection does affect allergic responses to other antigens. The role of glycans in this context is a particular focus of attention.

In Chapter 5, Holland and Hamilton ('The significance of cerebral toxocariasis') present interesting data on seroprevalence across a range of wild and laboratory-maintained hosts and review the evidence for cerebral infections and their consequences, and for the generally accepted concept that larvae accumulate in brain tissues. And then in Chapter 6 (which is the only contribution in a subsection entitled 'Animal models for toxocariasis') Akao reviews model systems for exploring the biology of the host-parasite relationship, and provides interesting and convincing data supporting the usefulness of Mongolian Jirds (*Meriones unguiculatus*) as laboratory hosts for *Toxocara*.

Section 2 mainly comprises clinical and public health aspects, and its 3 subsections, include human disease (4 contributions: Smith and Noordin, 'Diagnostic limitations and future trends in the serodiagnosis of human toxocariasis'; Magnaval and Glickman, 'Management and treatment options for human Toxocariasis'; Talyor, 'Ocular toxocariasis'; Piarroux *et al.* 'Toxocariasis and the skin'. All of these chapters provide detailed information and I found them to be highly informative. There then follow 2 chapters on the Immunology of Toxocariasis (Kayes, 'Inflammatory and immunological responses to *Toxocara canis*' and Hrczkova, 'Novel approaches to immunoprophylaxis for toxocariasis'). The third section entitled 'Epidemiology of toxocariasis', begins with John Lewis' contribution describing the use of a novel database linked to geographical information systems and global positioning

satellite. The SparkleSystems global resource on *Toxocara* and toxocariasis is a web-based database that is continually being updated, but has the capacity to provide users with a wide range of information, and to be deployed in a variety of ways, including access in the field and feed back from the field. Chapter 14, 'Exposure and environmental contamination', (Mizgajska-Wiktor and Uga) does an excellent job of reviewing sources of infection in the environment, and then this section ends on a chapter by Watts *et al.* describing a poorly-known related parasite *Baylis ascaris*, which is receiving more attention these days because of pollution of the urban environment by raccoons in the USA. This is another fascinating organism, about which there is still so much to learn.

Section 3 deals with veterinary aspects and comprises 3 chapters. Chapter 16 by Epe is entitled 'Current and future options for the prevention and treatment of canids' and Chapter 17 by Schantz 'Toxocariasis: the veterinarians's role in prevention of zoonotic transmission'. Between them they do a fairly comprehensive job of this particular dimension of toxocariasis. Chapter 18, however (Starke-Buzetti) describes another related parasite *T. vitulorum* which affects cattle and buffalo across a large part of the globe but especially in the tropics and semi-tropical zones. Its transmission, like that of *T. canis*, is dependent on the facility of larvae to remain dormant for long periods of time until activated again, but in this case transmission

is primarily *via* milk. The final section ('Economic Impact of the Disease') contains just 1 chapter (19) by Torgerson and Budke who explain how worthwhile estimates can be arrived at but also point out some of the many unknowns in the overall equation.

All in all, this is a very worthwhile attempt to bring together the current state of knowledge of this rather fascinating and, as the authors and editors point out repeatedly, 'enigmatic' parasite. The Editors in particular are to be congratulated on ensuring that the final product is so consistent and uniform in its individual components. They have done well to have recruited some of the top scientists working on *Toxocara* and to have ensured that the full spectrum of aspects, including both veterinary and medical, biological and molecular, chemotherapy and immunology, are all covered in comparable depth and detail. The book is well written, well structured and the various contributions (none being excessively long) bind together convincingly, generating a well-balanced reference text on *Toxocara* spp. I found the book to be very informative and enjoyed reading it. It will certainly have a prominent position on my desk for some time to come and I can recommend it to you.

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